



## **Sustained reversal of T2DM by intensive lifestyle intervention at diagnosis**

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## **Background**

**Previous studies have shown benefits of delaying the progression from IGT to frank diabetes by intensive lifestyle intervention <sup>1,2,3</sup>.**

**It is unclear whether reversal of T2DM can be sustained by lifestyle intervention once the diagnosis is made.**

1. Eriksson KF & Lindgarde F. Prevention of type 2 (non-insulin-dependent) diabetes mellitus by diet and physical exercise: the 6-year Malmo Feasibility Study. *Diabetologia* 1991; 34: 891–898

2. Knowler WC et al. Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002; 346: 393–403

3. Tuomilehto J, et al. Finnish Diabetes Prevention Study Group. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001; 344: 1343–1350.

## Study design

Cohort intervention with comparisons made at baseline and after 4, 8 and 16 months of lifestyle intervention.

## Inclusion criteria

- ❖ Recent onset T2DM (<6m)
- ❖ BMI>25kg/m<sup>2</sup>
- ❖ Naïve to diabetes or anti-obesity medications

## Methods

### Group Lifestyle Programme 4 Health



16-month programme:

- ❖ 8-month intensive intervention with **13 sessions**
- ❖ 8-month follow-up with **5 sessions**
- ❖ weekly exercise programme



## Methods

### *Blood sampling*

- ❖ At baseline, 4, 8 & 16 m fasting blood samples were taken for:  
  
Active GLP-1, Blood glucose, HbA<sub>1c</sub>, Lipid profile, Leptin, Ghrelin, HOMA, Glucagon
- ❖ At 16 m – we undertook a standard 75g OGTT.

# Results

## Subject characteristics at baseline (n=22)

Gender	14 male
Age	59 ± 9.6 years
Weight	97.7 ± 3.9 kg
BMI	33.7 ± 1.2 kg/m <sup>2</sup>
BP	145/84 ± 5/2 mmHg
HbA1c	6.7 % (5.6 – 7.0)
Fasting BG	6.5 mmol/l (5.9-6.9)
Cholesterol	4.5 mmol/l (3.6-5.0)

Normally distributed data expressed as mean ± SEM

Data without normal distribution expressed as median (lower – upper quartile)

## Drop out rate

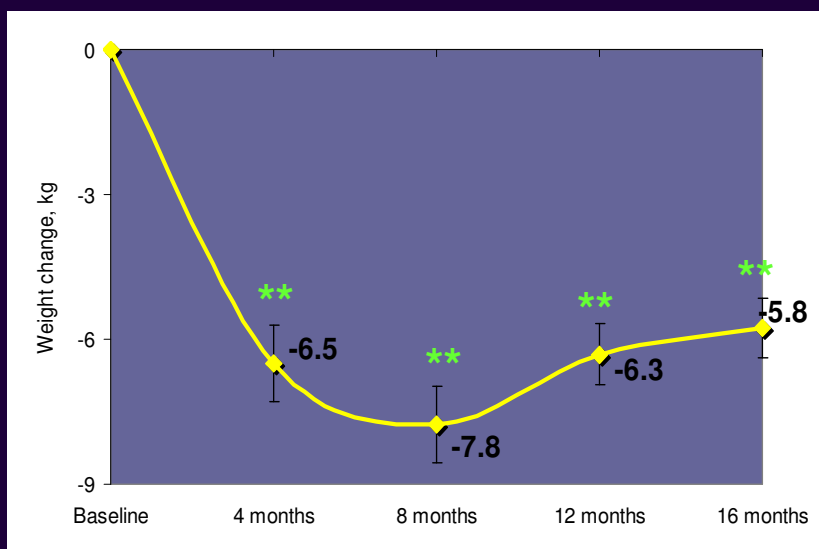
Before 4 months – 1 patient

Before 8 months – 1 patient

Before 16 months – 1 patient

Patient retention at 16 m – 86.4%

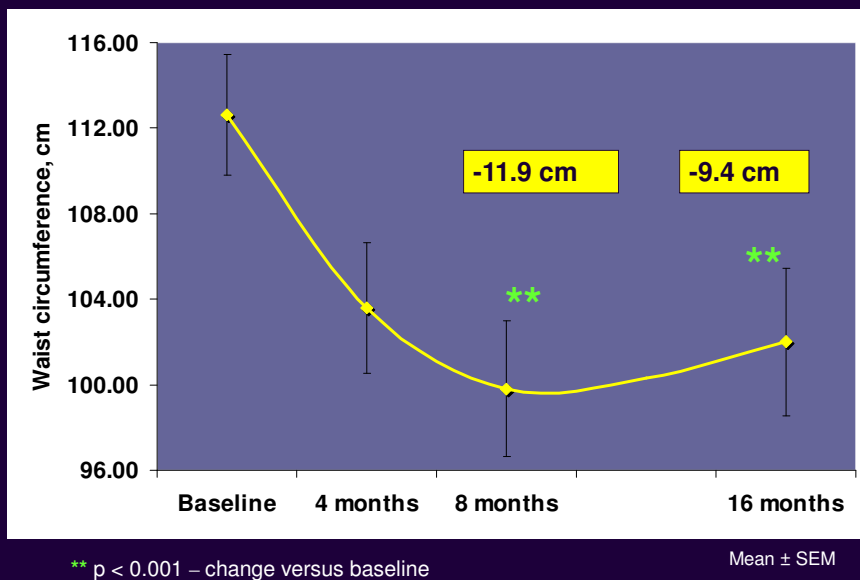
## Weight change



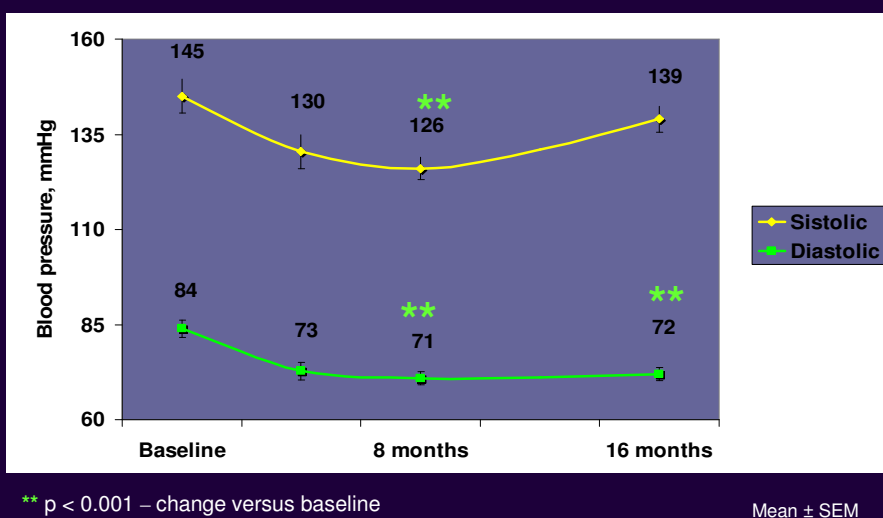
\*\* p < 0.001 – change versus baseline

Mean ± SEM

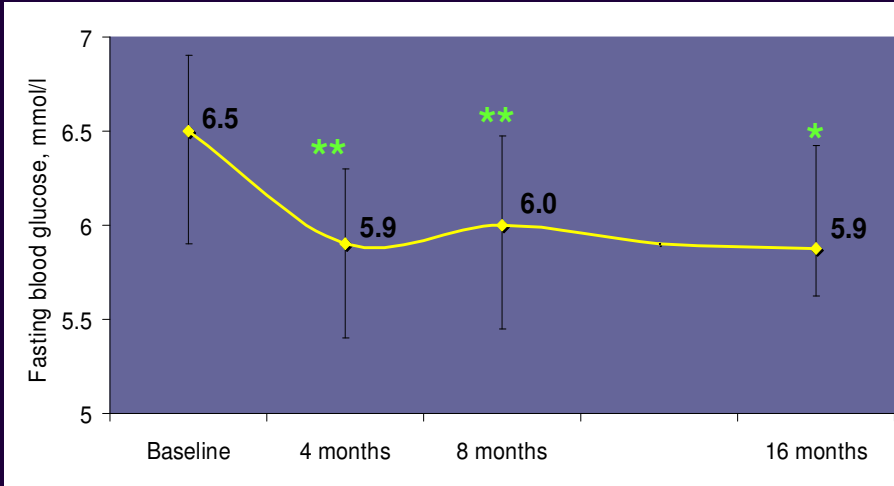
## Waist circumference



## Blood Pressure



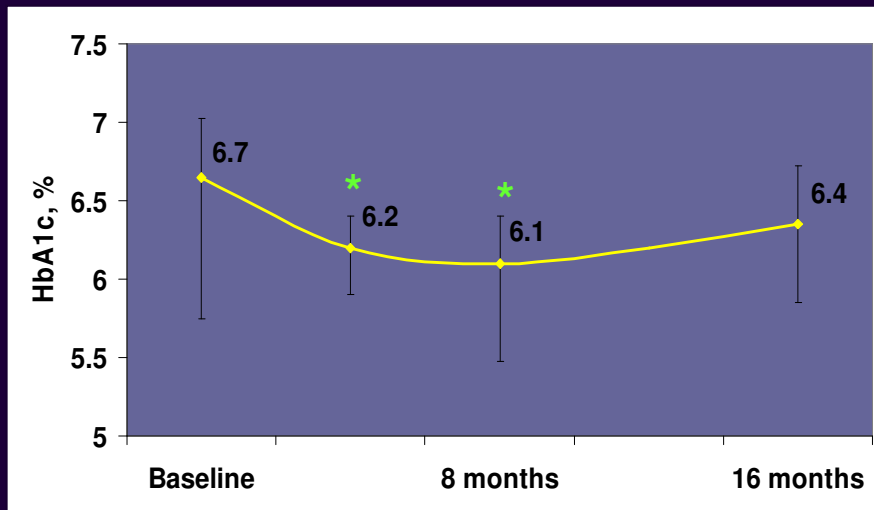
## Fasting Glucose



\* p < 0.05; \*\* p < 0.001 – change versus baseline

Median ± upper, lower quartile

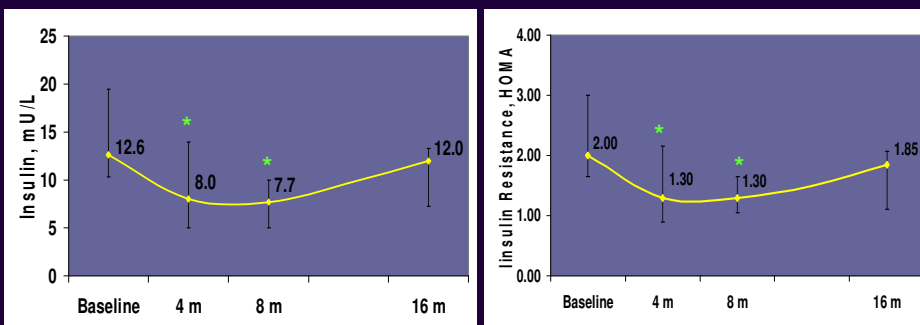
## HbA1c



\* p < 0.05 change versus baseline

Median ± upper, lower quartile

# Insulin      Insulin Resistance



\* p < 0.05 change versus baseline

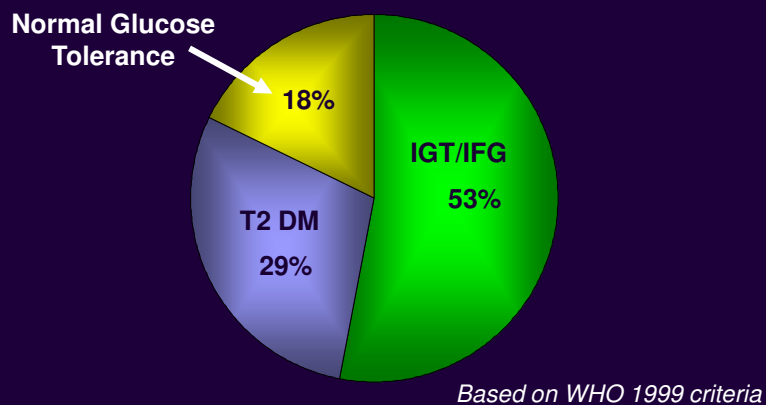
Median ± upper, lower quartile

## Active GLP-1

	Baseline	4 months	8 months
<b>Median</b>	<b>2.13</b>	<b>&lt; 2</b>	<b>&lt; 2</b>
Lower quartile	< 2	< 2	< 2
Upper quartile	2.89	2.60	2.69
n	22	20	20

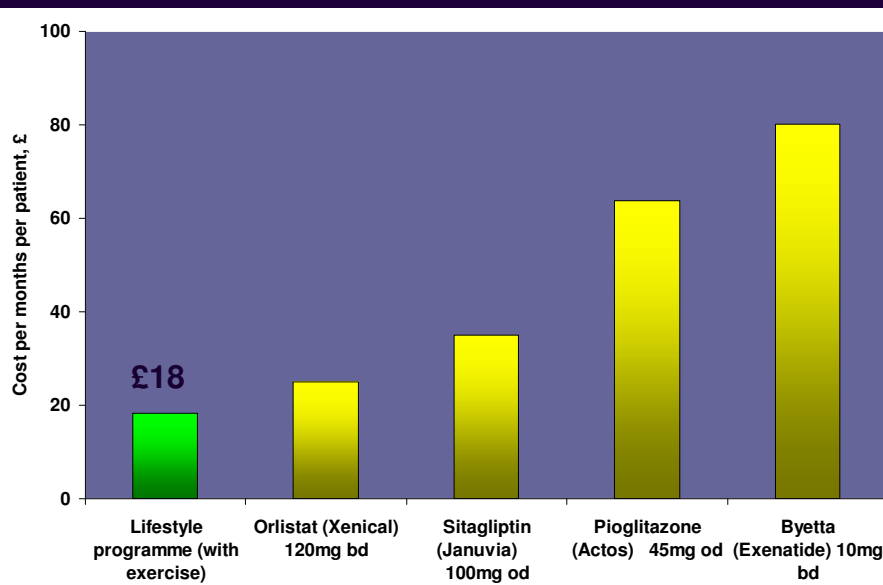
\* p < 0.05 - change versus baseline

## OGTT results after 16 months of lifestyle intervention (n=19)



1 patient subsequently required oral hypoglycaemic agents

## Costs per patient per month



## **Conclusion - 1**

**The sustained weight loss at the diagnosis of T2DM can result in long term improvement in diabetes control,  
with a significant proportion of patients reverting to IGT/IFG or Normal Glucose Tolerance.**

## **Conclusion - 2**

**Therefore it is possible with effective lifestyle intervention to achieve remission for a large proportion of people with new onset of T2DM.**

**Newly diagnosed people may respond more favourably to the encouragement to make lifestyle changes if we give clear positive evidence about the potential for reverting the progress of diabetes.**