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MEAL REPLACEMENT PROGRAMME FOR TYPE 2 DIABETES: THE SHEFFIELD EXPERIENCE

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Eighty to 90 percent of people with Type 2 diabetes are overweight and 60 to 90 percent of Type 2 diabetes is obesity related (1). It is well known that weight loss in overweight or obese subjects with Type 2 diabetes results in decreased insulin resistance and improved measures of glycaemic control. Weight management should be the primary nutritional strategy for this patient group.

Many of the Type 2 patients we see in our diabetes clinics have struggled with their weight for years, having already tried numerous conventional weight loss methods (and a few unconventional ones too!) usually with limited long-term success. They often feel that they will never be able to achieve weight loss and so become even more despondent as they watch a seemingly inexorable rise in weight as a result of taking diabetes medications. Intensification of therapy is often associated with weight gain. Sulphonylureas and glitazones cause a mean weight gain of 3.0kg and initiation of insulin a gain of 5.0kg (1). It was clear to us that we had to offer this group of patients a different approach to weight management. Research supports the effective and safe use of meal replacement programmes in the treatment of obesity, so we decided to offer this as a treatment option.

WHO IS SUITABLE FOR A MEAL REPLACEMENT PROGRAMME?

We offer the Meal Replacement Programme (MRP) to patients with Type 2 diabetes who have a BMI over 30kg/m2 with sub-optimal glycaemic control (HbA1c 68mmol/mol or above). They will usually have failed to lose weight using other lifestyle or pharmacological interventions. They need to be motivated to make changes. Before starting the MRP the patient is assessed by one of the diabetes consultant physicians as to their medical suitability to follow the diet. Contraindications include women actively trying to become pregnant, those with significant renal disease, uncontrolled heart failure, a recent myocardial infarction, TIA, stroke or unstable angina.

WHAT IS THE MEAL REPLACEMENT PROGRAMME?

- Three meal replacement milkshakes, soups or bars a day (e.g. Slimfast, Celebrity Slim, Tesco's Ultra Slim)
- Two servings of non-starchy vegetables (approx 75kcals per serving)
- Two portions of fruit
- Half a pint of skimmed milk for tea/coffee
- At least 1.0 litre of fluids additional to usual intake to ensure adequate hydration

No other foods are allowed

This provides approximately 800 to 1,000kcals and 110 to 125g of carbohydrates per day.

The MRP is followed for 12 weeks. On Day 1 of the diet, insulin doses are reduced by at least 50 percent and sulphonylureas are stopped to avoid the risk of hypoglycaemia. Patients on warfarin should have their INR checked more frequently. Doses of anti-hypertensive medications may need to be reduced as weight loss occurs.

Patients are asked to monitor their blood glucose levels pre-meals and at bedtime. The patient attends clinic every two weeks whilst following the diet. If this isn't feasible, then we offer telephone or email contacts and endeavour to meet face to face once a month. During these appointments we take their weight; ensure that they are adhering to the diet as prescribed and check that they have an adequate fluid intake. We review their blood glucose results and enquire about any hypoglycaemic events, recommending changes to diabetes medications as required in order to maintain adequate glycaemic control. This is also an opportunity

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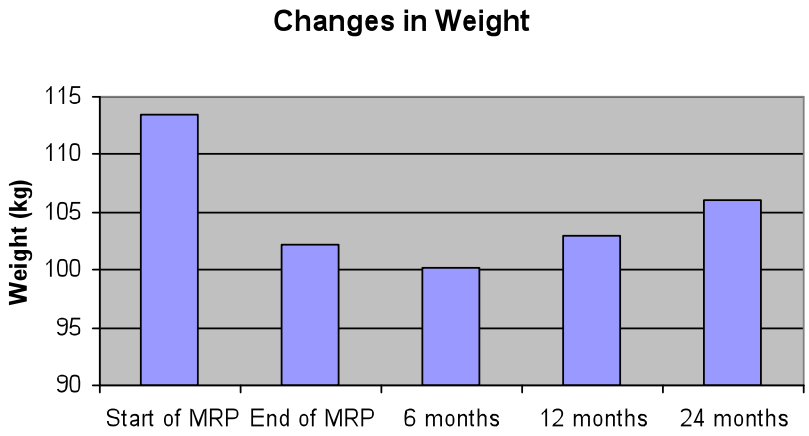
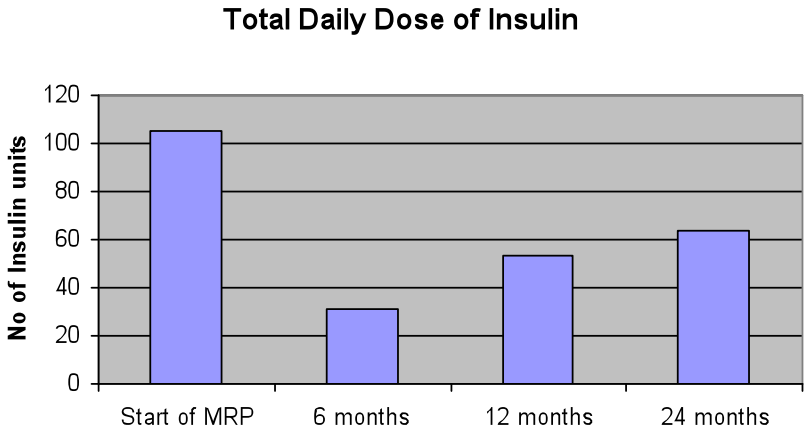
Graph 1: Changes in Weight



Current research shows that meal replacement diets promote greater weight loss than more conventional methods in the short term, but that improvements in glycaemic control tend to deteriorate after one year

Graph 2: Total Daily Dose of Insulin



to encourage the patient, congratulate them on their progress and help them resolve any issues or concerns they may have. We discuss past eating behaviours and ask them to think about how they will manage the reintroduction of proper meals.

At the end of the 12 weeks, meals are gradually reintroduced with appropriate guidance on portion size. We discuss the principles of a healthy diet and ways of maintaining weight loss. We often find that in following the diet, patients have been given space and time to reflect on their eating habits and lifestyle. Many can identify what needs to change to promote long-term weight maintenance. Blood glucose levels should continue to be monitored through this stage and, once the patient is established on a normal diet, we organise a diabetes medications review by a diabetes specialist nurse. During the food reintroduction stage the patient is seen once a month.

The majority of patients say that the diet is easy to follow. Many express relief that whilst on the diet they have very few decisions to make about what and how much to eat. They are encouraged by being able to make dramatic reductions in their dosage of diabetes medications from the start. We make it clear to patients that they are likely to need to increase their doses again once they are back to eating normally. The limited carbohydrate intake means that blood glucose levels are reduced, often into the normal range. This leads to increased energy and feelings of wellness. Many will become more active and begin to exercise. The rapid weight loss usually provides the motivation needed to continue on the diet.

HOW SUCCESSFUL IS THE MEAL REPLACEMENT PROGRAMME?

Current research shows that meal replacement diets promote greater weight loss than more conventional methods in the short term (2), but that improvements in glycaemic control tend to deteriorate after one year (3, 4). The data presented here is based on 16 of our patients who we followed up over two years.

The mean average weight loss over the 12 weeks was 11.3kg. One year post MRP, weight began to increase, but even at two years post MRP, the mean average weight loss was 7.4kg compared to the starting weight. Seven out of 16 patients maintained a weight loss of at least 10kg. On average HbA1c was reduced by 0.4% by the end of the diet and this reduction was maintained for up to a year. At two years, four out of 16 had maintained a reduction in HbA1c of more than 1.0% and eight out of 16 had a reduction of over 0.5%. Four showed no improvement or deterioration in HbA1c. Total daily insulin dose was dramatically reduced whilst following the diet. At two years, the patients were still on much reduced doses of insulin compared to baseline, but, of course, for those whose HbA1c had increased, it is clear that their insulin requirements needed to be reviewed.

Our experience has shown us that the MRP is a safe and effective method of weight loss. We intend to continue offering the MRP to our patients and are working towards ensuring that tighter glycaemic control is maintained post weight loss in these patients. We have helped some patients achieve remarkable results. Martin's story in the following case study is testament to this.

Case study

Martin is 28 years old. He was diagnosed with Type 2 diabetes at the age of 21 and rapidly progressed to needing insulin. His weight at diagnosis was 130kg, BMI 38.2kg/m2. Martin reported being overweight as a child and had attended Weight Watchers at the age of 14. In 2006, he successfully lost 5.4kg whilst using Orlistat. From 2006 to 2009 his weight and HbA1c fluctuated. The lowest HbA1c he achieved was 8.5%.

In November 2009, after a discussion with his diabetes consultant, Martin agreed to try the Meal Replacement Programme. His weight at this time was 151.9kg, BMI 44.9kg/m2 HbA1c 8.7% He was injecting 160 units of Mixtard 30 bd. Before commencing the diet his insulin was changed to Insulatard 60 units bd and he was restarted on slow release Metformin 500mg bd. I reviewed Martin after he had been on the diet for two weeks. He had lost 8.3kg. He had reduced his insulin to 40 units bd and his blood glucose readings pre-meals ranged from 4.0 to 7.0mmol.

Martin managed to continue the diet over Christmas, giving himself Christmas Day off and at the end of 12 weeks weighed 125.6kg, a loss of 26.3kg. He was injecting 35 units of Insulatard bd. His HbA1c in March 2010 was 6.7%. Martin's aim was to try and lose more weight and over the next four months he lost a further 4.3kg through reducing his portion sizes and limiting his alcohol intake. In June 2010, he went back on the MRP for a further 12 weeks. He was started on Exenatide 5μg bd and reduced his insulin further. After six weeks on the MRP he was able to stop his insulin completely and increased the Exenatide dose to 10μg bd. He lost 12.4kg over the 12 weeks bringing his weight to 114.5kg.

Martin has been maintaining his weight at 110kg, BMI 32.5kg/m2 for the past year. He has switched to Liraglutide 1.2mg od as he struggled to fit the twice daily Exenatide injections into his lifestyle. His latest HbA1c is 62mmol/mol (approx 7.6%). He has recently set himself a target of reaching less than 100kg.

I asked Martin about his experience of the MRP: "Before the diet I wasn't happy with my weight, but felt losing weight would take a long time, be slow and difficult. I have dieted before and always find it a pain, there was never a quick result and habits wouldn't change. After thinking it through, it was time to change to stop problems in the future. My weight had started affecting my health - things were becoming more difficult, my knees were particularly bad.

"At first I found the diet easy to follow - it's quite self-explanatory. I liked the fact that results were fast. What I found most helpful was being seen every two to four weeks. This helped monitor my progress. Setting goals for my next appointment gave me something to work towards. The best support I got was being listened to and getting suggestions for ways in which problems could be solved. This helped keep me on track. I've tried different ways of losing weight for years from different people and departments at different hospitals and I can say that this is the most rewarding and successful method. Once I saw results, it was easier to keep the work up and keep the weight off. In doing this diet, and looking at my lifestyle, I have been able to stop insulin and change to different medication. This in turn has helped and encouraged me to lose more weight.

"The hardest time for me following the diet was the weekend - I missed having a beer with friends and a takeaway. After a few weeks I got used to diet coke – and occasionally would allow myself a drink (a spirit and diet mixer). It was a struggle being hungry, but I found that having a pack of chewing gum at hand could sometimes stop that. It was mainly junk food I missed and for the first month or so if I could avoid them, the urge would go.

"Family and friends were very supportive. My Mum helped keep me on track when it was difficult. The diet has made me realise what I put in my body and how it affects me. It has also made me look at exercise and being healthy in general. I still enjoy takeaways and unhealthy things - but in moderation. I consider portion sizes in what I eat. I try and drink less alcohol than I used to. This may mean drinking spirits instead of lager or having a sensible meal instead of a takeaway.

I have changed the way I live. My health and fitness are better and I have found my blood pressure, blood sugar and insulin use have fallen (I now don't take insulin at all). Simple things like climbing stairs don't make me out of breath. Work is much easier and thanks to losing the weight I get to do more - I travel abroad as part of my job now. I can do strenuous tasks at work which I couldn't have done before. I enjoy going out now - something I used to hate doing."

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Questions relating to: *Meal replacement programme for Type 2 diabetes: the Sheffield experience.*
Type your answers below and then **print for your records.** Alternatively print and complete answers by hand.

Q.1	Describe why weight management is so important in obese patients with Type 2 diabetes.
A	
Q.2	What is a Meal Replacement Programme (MRP)?
A	
Q.3	When would it be suitable to offer a patient the MRP?
A	
Q.4	Which patient groups cannot be offered the MRP?
A	
Q.5	What is the medication programme during the 12-week MRP?
A	
Q.6	What checks are made by the dietitian during the MRP clinic appointments?
A	
Q.7	Briefly describe the dietetic follow-up process after the 12-week MRP.
A	
Q.8	How successful is the MRP?
A	

Please type extra notes here . . .