

Intermittent Fasting & Type 2 Diabetes (T2D) in Primary Care



Sarah McDiarmid

PCN Diabetes Dietitian, West Leeds Primary Care Network

NIHR PhD Research Fellow, University of Manchester

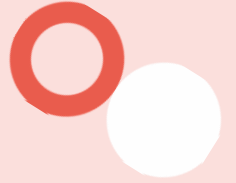
sarahmcdiarmid@nhs.net (*without a dot*)

sarah.mcdiarmid@manchester.ac.uk (*with a dot*)





1. **What is intermittent fasting?**
2. **Evidence base**
 - MIDDAS trial: my research on 5:2
 - Time for questions
3. **Practicalities of the 5:2 diet**
4. **Case study**



1. What is intermittent fasting (IF)?



Intermittent Energy Restriction (IER)

“5:2 diet”

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Low calorie days*	Low calorie days*	Healthy eating	Healthy eating	Healthy eating	Healthy eating	Healthy eating

Alternate day fasting (ADF)

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Healthy eating	Low calorie days*	Healthy eating	Low calorie days*	Healthy eating	Low calorie days*	Healthy eating

Time Restricted Eating (TRE)

“16:8”

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
12am	Fast	Fast	Fast	Fast	Fast	Fast	Fast
4am							
8am							
12pm	Eat Normally	Eat Normally	Eat Normally	Eat Normally	Eat Normally	Eat Normally	Eat Normally
4pm	Fast	Fast	Fast	Fast	Fast	Fast	Fast
8pm							
12am							

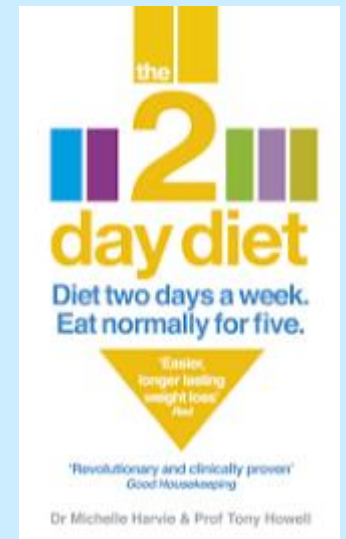
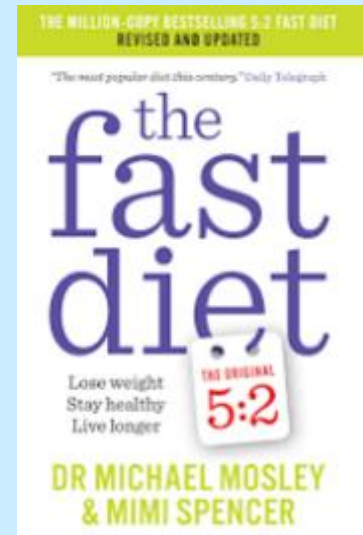
Low calorie days (500-850kcal)

Food-based e.g.

- Dr Mosley's 'Fast Diet' encouraged unlimited foods with 500/600kcal limit (25% of requirements), 2 meals/day
- The '2 Day Diet' (Harvie et al.) used a '**portion approach**' ~ 850kcal/day
- **Benefits** – 'real food', more fibre, enc++ healthy choices
- **Cons** – more complex, not necessarily nutritionally complete

Meal replacements (Total Diet Replacement: TDR)

- 3-4 shakes/soups/bars per day +/- vegetables
- Nutritionally complete in ~800kcal/day e.g. Optifast, Exante, Altralife, Shake that Weight
- **Benefits** – easy, accurate calorie control, sufficient protein
- **Cons** – not palatable, miss 'texture'



At a glance factsheet



2. Evidence base...

Impact of IF on weight
& glycaemic control





Mechanism of action of IF

- Intermittent fasting will only result in weight loss if calorie intake is sufficiently reduced !!
- Possible metabolic benefits independent of weight loss e.g. improved insulin sensitivity, ↓ oxidative stress & inflammation, ↑ autophagy





Impact on weight & glycaemic control

Intermittent Energy Restriction (5:2 & ADF)

Compared to daily calorie restriction:

- Slightly better weight loss (7% v 5%) in the short term (<6m) but weight loss is comparable in the long term (5-6%)
- Similar improvements to glycaemic control

Time Restricted Eating










- Calorie intake ↓ 200-300kcal/day but weight loss is more modest (3% short term, 1% long term)
- Modest improvements to glycaemic control are attributed to energy deficit rather than food timing
- Healthier profiles (e.g. body fat %) with earlier eating windows

.... **So intermittent fasting is not a panacea**



The MIDDAS trial

Manchester Intermittent versus Daily Diet App Study (MIDDAS): A pilot randomized controlled trial in patients with type 2 diabetes


Sarah McDiarmid MMath^{1,2}  | Michelle Harvie PhD^{1,3,4}  |
Rhona Johnson RSCN²  | Avni Vyas MPhil¹  | Azza Aglan ClinPsyD⁵ |
Jacqui Moran RD²  | Helen Ruane BSc¹  | Amanda Hulme BSc²  |
Katharine Sellers BSc¹  | Basil G. Issa FRCP² 

Diabetes Obes Metab. 2022;24:432–441.



Background


- **NHS Type 2 Diabetes Path to Remission programme** is an example of a Continuous (daily) Low Energy Diet ("**CLEDs**") - can achieve large weight loss & remission e.g.

 CLEDs are not for everyone & weight regain is a key issue


Study design

- 12 month pilot randomised trial, n = 79 patients with overweight/obesity & T2D diagnosed in last 8 years
- Compared an Intermittent low-energy diet ("**ILED**") "5:2" with a Continuous (daily) low-energy diet (**CLED**)
- Primary outcomes – change in weight & HbA1c

CLED – 12 weeks



ILED – 28 weeks



Diet & support

- **Low calorie days** (in ILED & CLED): 3 x Optifast meal replacement shakes + 7 portions non-starchy veg (or food-based alternative)
- **Non-low calorie days** (in ILED & CLED): Mediterranean diet using our “portion approach”
- **Supported by an MDT** (dietitian, nurse & psychologist)
 - Dietitian: weekly, fortnightly then monthly support. Seen twice at baseline & 52 weeks. Remainder of contacts via an app.



Medication management

- Diabetes & BP medications were adjusted at baseline according to the trial protocol
- Baseline adjustments:
 - Dependent on starting HbA1c & BP
 - Aimed at preventing hypoglycaemia & hypotension
- Titration during the study:
 - Clinical judgement based on self-monitored values of blood glucose & BP
 - Metformin was continued even if HbA1c<48



MIDDAS protocol

Self-monitoring of BP & BGL is key

Results

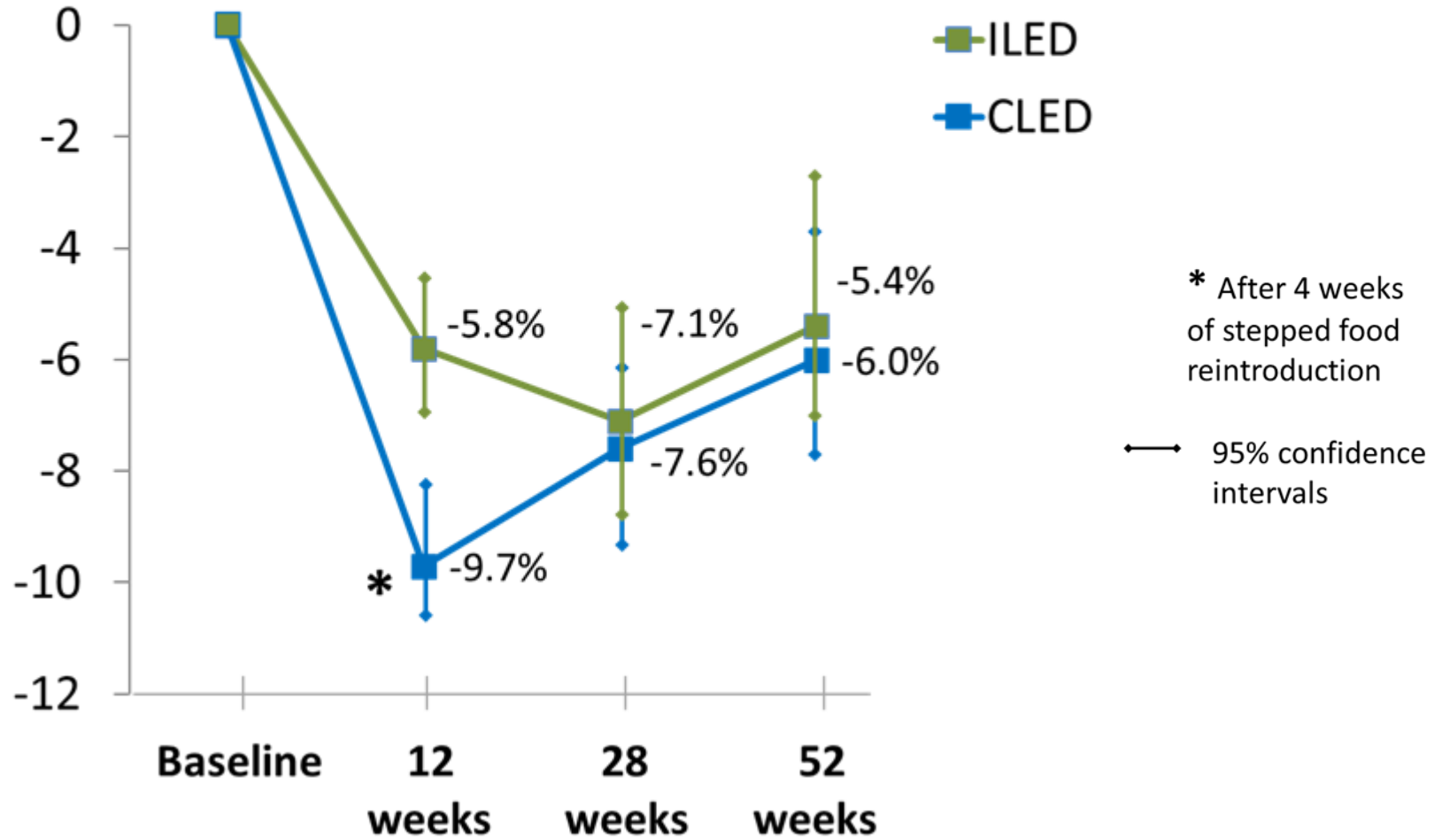
Weight

- CLED lost more weight than ILED by the end of their active weight loss phase (*12 weeks for CLED & 28 weeks for ILED*) (-9.7% v -7.1%)
- **BUT** both groups ultimately regained weight and achieved similar overall weight loss by week 52 (6.0% v 5.4%)
- About 1/5 of participants achieved 10% weight loss or more in both groups

HbA1c

- 42% in each group achieved a HbA1c < 48 with mean HbA1c ↓ 8 mmol/mol
- However, CLED achieved this reduction with less diabetes medication

Trend in % weight loss (ITT)



Retention

Patient experience

- ILED patients found slow weight loss frustrating but expressed greater confidence in their adherence & long-term success than CLED
- ILED remarked liked the feeling they weren't "dieting"/restricting every day
- Continued individualised support from HCPs important
- Self-monitoring of BG, BP, weight, diet & activity levels was useful

Conclusions

- The 5:2 may be an effective alternative to a daily low-calorie diet...one of many dietary approaches



CHRONIC DISEASE | [Free Access](#)

Dietary strategies for remission of type 2 diabetes: A narrative review

Adrian Brown, Paul McArdle, Julie Taplin, David Unwin, Jennifer Unwin, Trudi Deakin, Sean Wheatley, Campbell Murdoch, Aseem Malhotra, Duane Mellor 

First published: 29 July 2021 | <https://doi.org/10.1111/jhn.12938> | Citations: 23

- IER (5:2 & TRE) is unlikely to be as effective at remission as daily low-calorie diets but bigger trials are needed

**Questions or reflections
from your own experience
of intermittent fasting?**



**Do you feel it is realistic to
implement intermittent fasting,
including the 5:2, in primary care?**





3. Practicalities of the 5:2 diet



Safety of intermittent fasting (IF)

1. Not appropriate for:

- Active or historic eating disorders or other severe mental illnesses, alcohol or substance misuse
- Liver failure
- Unstable cardiac or cerebrovascular disease

2. Need more evidence:

- Pregnancy/lactating
- Gout/gallstones (linked to degree of weight loss)

Side-effects of low calorie days

- **Minor** (usually pass within a few days): fatigue, dizziness, headaches, constipation, nausea
- **Rare:** gout/gallstones, hair loss

Self-monitoring of BP & BGL is key

Low calorie day resources

1. Meal replacements

- e.g. Optifast, Exante, Altralife, Shake that Weight & vegan range with 'Fast 800'

2. Food based approach

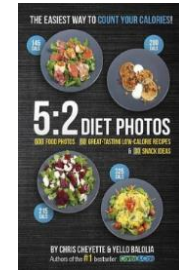
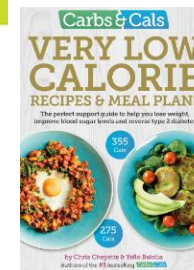
- Calorie counting** ~ 500-850kcal (~800kcal helps compliance & nut. completeness)



- Carbs and Cals recipe books & factsheets
- Fast Diet book – includes recipes
- Sheffield Hospitals dietitian resource – simple meal ideas
- Apps e.g. MyFitnessPal

- “Portion approach”**

- 6 food groups: starchy carbs, protein, unsaturated fats, fruit, veg, dairy**
- 2 Day Diet book & recipe book
- MIDDAS booklet & recipe booklet (leave email)



Sheffield Teaching Hospitals NHS Foundation Trust

Intermittent fasting

An introduction for people with diabetes

Information for patients
Dietetics - Diabetes

Non-low calorie days (food-based)

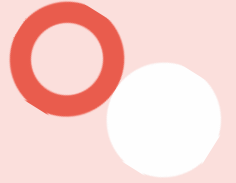
1. **Ad lib approach** (encouraging a Mediterranean-style diet/healthy eating)
2. **Calorie counting**

$$\begin{array}{c} \text{Energy} \\ \text{requirements} \\ \text{on non-low} \\ \text{calorie days} \end{array} = \frac{\left(\begin{array}{c} \text{Energy} \\ \text{requirements} \\ \text{for weight} \\ \text{loss} \end{array} \times 7 \right) - \left(2 \times 850 \text{ kcal} \right)}{5}$$

3. **'Portion approach'** (starchy carbs, protein, unsaturated fats, fruit, veg, dairy)

Tips

- **Quality diet**
 - Encourage Mediterranean-style diet
 - Encourage protein (e.g. 2 meals/day + snacks) for satiety & preservation of muscle
 - Extra fluid - may need additional salt for headaches on low calorie days
- **Flexibility**
 - Low calorie days apart or together
 - Non-low calorie days – try different approaches
- **Self-monitoring**
 - BP & BG – for safety
 - Weight, food diary, portion counter
- **Activity**
 - Individual – some feel they can exercise on low-calorie days, others can't
 - Encourage some basic resistance exercise for 5-10 mins 2-3x a week to help preserve muscle mass



5. Case study

(The two factsheets today may help)

