Dr Trudi Deakin, PhD

"Every great achievement was once considered impossible" - Unknown

About me

I'm 53 years old and live in Hebden Bridge, West Yorkshire.

I qualified as a registered dietitian in 1993 and worked for 15 years in the NHS, mainly as a diabetes specialist dietitian across the age span but latterly as the Clinical Champion for Diabetes for the East Lancashire Diabetes Network.

I've always believed in not doing things just to tick a box and have a questioning analytic mind that considers the purpose in everything I do. This resulted in me being instrumental in changing the way that healthcare is delivered to people with diabetes with the development, implementation and evaluation of the X-PERT Diabetes Programme, that is a national NICE compliant, structured education programme, that is improving the health and wellbeing of many people with diabetes. More information at www.xperthealth.org.uk

Why I wanted to do ZeroFive100

"Do not go where the path may lead, go instead where there is no path and leave a trail"

- Ralph Waldo Emerson

At university I was taught that we should eat frequent meals and base them on carbohydrate. I was also informed that the brain requires 130g glucose daily. However, in the dietary reference guidelines [1] on page275 it states ***"The lower limit of dietary carbohydrate compatible with life apparently is zero, provided that adequate amounts of protein and fat are consumed"***. This is because if we don't eat carbohydrate to get glucose, we can make it. Around 56g of glucose can be derived from 100g of protein and 10g of glucose can be made from 100g of fat.

The definition of an essential nutrient is "*A nutrient in which an organism must obtain from the environment or from a dietary source since the organism is unable to synthesize it*". As we can make glucose, clearly carbohydrate it is not an essential nutrient unlike protein and fat.

A natural by-product from fat burning, ketones, can provide 80% of the brain's fuel, so the absolute daily glucose requirement for the brain is only about 26g! The liver has the capacity to make 25g glucose *per hour!!* [2].

Recognising that diabetes (both Type 1 and Type 2) are carbohydrate intolerant conditions, I realised that it was important for people to only eat carbs to tolerance. In 2014, after winning the carb debate at the Diabetes UK Annual Professional Conference, I started a journey to explore what it would be like to fuel from fat. My journey started by reading "*The Art and Science of Low Carb Living*" [3], which resulted in me changing my own diet to consume fewer than 50g carbs per day. Now 6½ years later, with no bread, potatoes, cereal, rice, pasta etc, I have never felt healthier or more energetic.

Therefore, when asked by Dr Ian Lake, whether I would like to participate in ZeroFive100, I didn't hesitate in accepting the invitation. My burning question was: in somebody who is already fat adapted, is it possible to solely fuel from one's fat stores for five days whilst completing 100 miles?

I believe that "one size doesn't fit all" and people need to experiment to find what works for them and I certainly wouldn't remember this challenge to anyone who relies on frequent carb snacks for fuel!

Training

Exercise: I stopped running three years ago due to wear and tear pain in my knees. So, from the outset I intended to walk and not run the 100 miles. However, walking takes longer than running and as Chief Executive of the charity X-PERT Health, I don't have a lot of spare time! Thus, my only training was a daily 3 to 5 mile walk in the evening in the beautiful hills surrounding Hebden Bridge. Occasionally at the weekend I managed to achieve 10-15 miles but this was rare.

Fasting: As there is emerging evidence for the benefits of fasting for health and longevity, I have been experimenting with fasting for five years. In the main I practice time-restricted eating with an extended overnight fast of around 16 hours with a daily eating window of eight hours. However, I have also tried fasting for extended periods of time, from 24 hours to five days (120 hours). During lockdown, with working from home, I have found this harder – having lunch provides a break in the day! However, between March and August 2020, I did complete one three-day fat and two, four-day fasts. Once I set my mind that I was undertaking these fasts, I did find them surprisingly easy consuming only water and black coffee, even when preparing meals for my partner.

Pre-day: Friday 18th September

Weight – 65.3kg
Waist – 75cm
Mean blood glucose - 4.4 ± 0.7 mmol/L
Ketones – 1.5 mmol/L
Distance covered – 5 miles

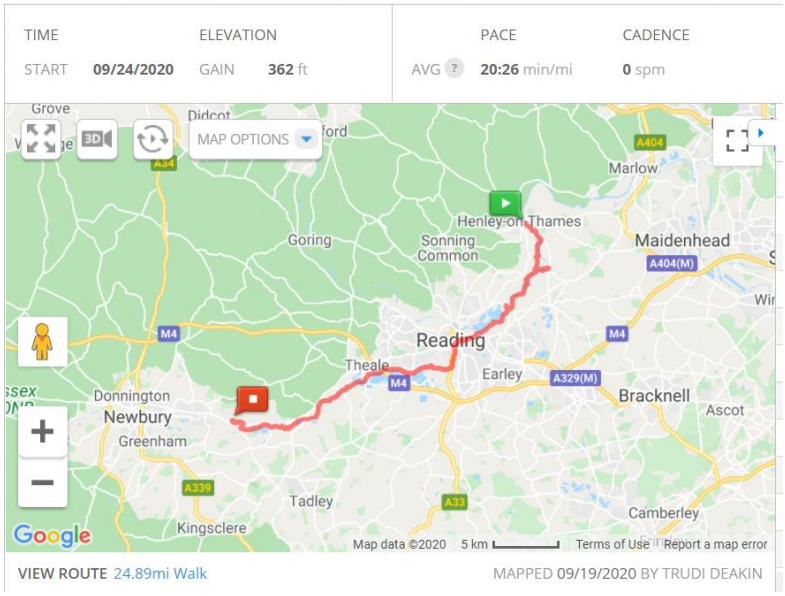
I was a little apprehensive, not about the fasting, I knew I could do that! My concern was covering the 100 miles as I was aware that my training had been inadequate. When not fasting I always eat a nutrient dense diet and I made sure that my last meal before the fast contained an abundance of nutrients, it was 250g liver with three fired eggs ☺

Day 1: Saturday 19th September

Weight – 65.3kg
Waist – 75cm
Mean blood glucose - 4.1 ± 0.6 mmol/l
Ketones – 2.6 mmol/L
BMR – 2059 calories
RQ – 0.73
Distance covered – 25 miles

We met in Henley-on-Thames and walked to just outside Newbury. Due to meeting the team and having all the metabolic tests done, we didn't start until lunchtime and therefore I was still walking on the canal bank when it turned dark. This didn't deter me though and I declined the invitation for the minibus to pick me up. Energy levels were high and I felt highly motivated. Being fat adapted meant I

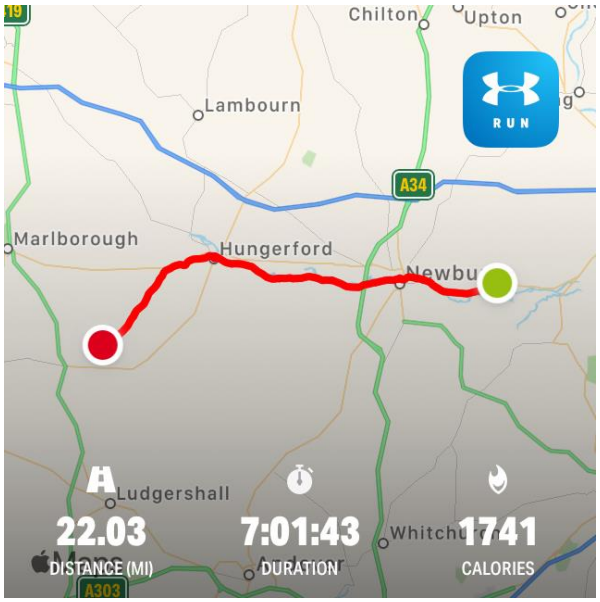
was fuelling from my fat stores from the outset and the ketone and respiratory quotient (RQ) results confirmed this.



<u>Day 2: Sunday 20th September</u>

Weight – 63.9kg
Waist – 74cm
Mean blood glucose - 4.3 ± 1.3 mmol/l
Ketones – 3.3 mmol/L
BMR – 1685 calories
RQ – 0.54
Distance covered – 22 miles

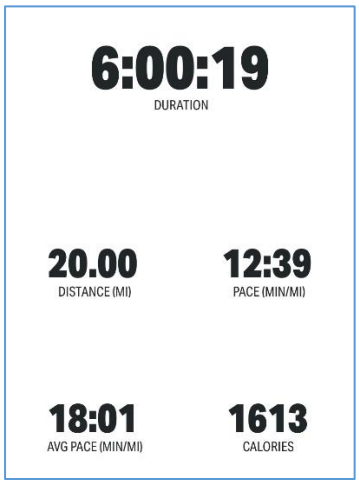
By Day 2 I had lost 1.4kg and my RQ had reduced demonstrating an even greater amount of fat burning confirmed by the increase in ketones. This was my worst day – but only during the last couple of miles. We walked (with a little bit of running in between) from Newbury to Marlborough. We finished long before it was dark and a hot shower was well received. Chatting with fellow colleagues during the evening refreshed my attitude and once again I felt invigorated and fired up for Day 3.



Day 3: Monday 21st September

Weight – 63.3kg
Waist – 72cm
Mean blood glucose - 3.3 ± 0.4 mmol/l
Ketones – 4.3 mmol/L
BMR – 1576 calories
RQ – 0.63
Distance covered – 20 miles

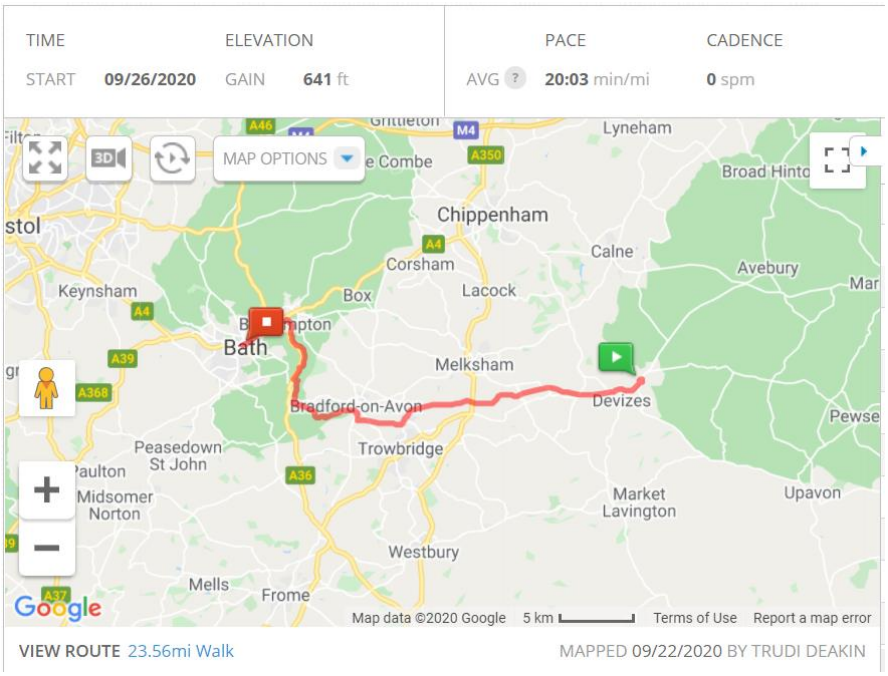
By Day 3 I had lost 2kg and 3cm from my waist and once again the RQ and ketone level confirmed that I was fuelling from my fat stores. During Day 3 whilst walking the 20 miles from Marlborough to Devizes I felt completely energised with NO energy dips and that evening I thoroughly enjoyed my muscles being stretched by a sports massager.



Day 4: Tuesday 22nd September

Weight – 63.3kg
Waist – 70cm
Mean blood glucose - 3.5 ± 0.3 mmol/l
Ketones – 5.4 mmol/L
BMR – 1869 calories
RQ – 0.74
Distance covered – 23.5 miles

Now this was an interesting day. Although I was clearly fuelling from fat, there was no weight loss. This could be because my body was making glucose via the process of gluconeogenesis and I was laying down stored glucose (glycogen) in my muscles. If this is the case, for each gram of glucose stored, I would store 3 grams of water. Nevertheless, I once again completed the day from Devizes to Bath completely energised and no dips in my energy levels.



Day 5: Wednesday 23rd September

Weight – 62.3kg
Waist – 70cm
Mean blood glucose – 2.7 ± 0.5 mmol/l
Ketones – 7.6 mmol/L
BMR –2042 calories
RQ – 0.94
Distance covered – 10 miles

I couldn't believe that we were almost at the end of our challenge. We all finished together in the centre of Bristol at 1pm.

The time had flown by. There hadn't been a single time that I had been truly physiologically hungry. Yes, I had missed eating but only for psychological reasons – I like eating! It was also very interesting to see my results on the Wednesday morning before we set off. I had lost 1kg since the day before – perhaps this means that I had utilised the muscle glycogen stored the previous day? The RQ certainly seemed to suggest this as it had dramatically risen to the carb burning range! However, the ketone level still indicated that I was also deeply into fat burning. Once all the results have been analysed by experts along with cortisol and lactate, it will be very interesting to further understand what is going on and the variation between members of the group.

"Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning" - Winston Churchill

Post-day: Thursday 24th September

Weight – 62.4kg
Waist – 71cm
Mean blood glucose - 3.2 ± 0.5 mmol/l
Ketones – 1.7 mmol/L
Distance covered – 7 miles

Absolutely amazing. I leapt out of bed with NO muscle aches or pains. How is that possible? After undertaking the London marathon in 2010 (then a carb burner), I couldn't walk properly for days and really struggled to stand up and sit down. To say that I had completed four marathons in five days with no calories and very little sleep, I also could not believe how energetic I felt. Would I do it again? No! Why? I don't need to! The experiment was a 100% success and shows that fat adapted people can easily fuel from their fat sores for five days whilst covering 100 miles on foot.

Daily intake

Water, black coffee, supplements (2 x electrolytes, magnesium, zinc, vitamin C) and occasional finger dip into Himalayan salt!

Pain

Zero pain during the day except for when I got a blister on the ball of my foot, although this was soon relieved by walking in flip flops! I had NO muscle aches, pains or cramps throughout or on completion of the challenge.

However, I did experience severe knee pain whilst lying down at night. I stopped running three years ago due to knee pain and can only assume that the pain was due to long-term wear and tear. The application of ibuprofen cream helped a little but the pain meant that I was only able to obtain two to three hours sleep per night. Some people report a reduced ability to sleep whilst fasting but this has not been my experience and therefore I completely attribute the lack of sleep down to my knees. As soon as I got out of bed and moved around every morning the knee pain completely disappeared!

Myths explored

Isn't this starvation? No, I was absolutely fuelled throughout the five days – from my fat stores. At the start of the challenge I weighted 65.3kg and with 22% body fat, this means that I had 129,294 calories of fat stored in my body. I will have used a max of about 4,000 calories per day, which totals 20,000 calories over the five days, only 15% of my fat stores!

Aren't ketones harmful? No, ketones are just a natural by-product of burning fat as an energy source. I have been in nutritional ketosis for 6½ years with no ill effects. Diabetic ketoacidosis (DKA) is a completely separate condition in people with uncontrolled diabetes and the two conditions should not be muddled.

This has been an extremely worthwhile investigation that should be used to further science. In addition to the health results shared above, lactate and cortisol levels were also monitored daily. All the results will be collated, analysed and published. What this space!

"*The world hates change, yet it is the only thing that has progress*" Charles Kettering

Acknowledgements

I feel humble and honoured to be part of this project and would like to thank the founder, Dr Ian Lake. Without his inspiration and determination, this project would not have taken place.

To the fellow ZeroFive100 collaborators who were all wonderful and provided motivation and interesting chats along the way.

To the support team who transported our luggage, provided water, monitored our clinical indicators, stretched our muscles and filmed our progress.

To the sponsors who made it all possible.

1. Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. 2005 https://www.nal.usda.gov/sites/default/files/fnic_uploads/energy_full_report.pdf
2. Webster CC, Noakes TD, Chacko SK, et al. Gluconeogenesis during endurance exercise in cyclists habituated to a long-term low carbohydrate high-fat diet. The Journal of Physiology 2016;594(15):4389-405. doi: 10.1113/JP271934
3. The Art and Science of Low Carb Living Book by by Jeff S. Volek and Stephen D. Phinney Published May 19th 2011 by Beyond Obesity LLC ISBN 0983490708 (ISBN13: 9780983490708)