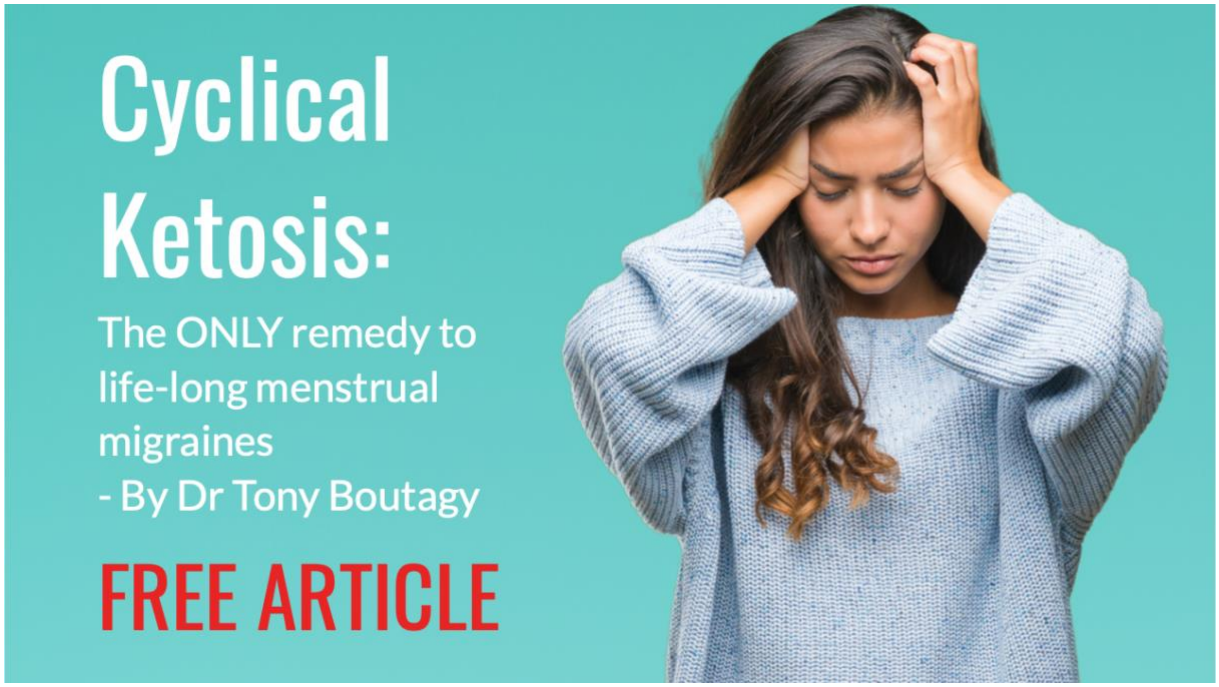

CYCLICAL KETOSIS: THE ONLY REMEDY TO LIFELONG MENSTRUAL MIGRAINES

My wife has suffered menstrual migraines her entire adult life. For many years, she had not quite made the connection with her cycle and the headaches. Often thinking that the neck and shoulder tightness that would occur just before the onset of the headaches were caused by poor posture or inflexibility in that region, she tried to solve the headaches by stretching, myofascial release, massage and chiropractic treatments. She also sought relief by talking numerous natural supplements that targeted 'female hormone' pathways, all with no effect. Furthermore, generic pain medication did not provide any meaningful reduction in symptoms and thus she was left with heavy duty pain pharmaceutics – which left her drowsy and 'out of it' or was bound to be laid out in bed for one to two days every month when the pain was at its peak.

Having some basic familiarity with the ketogenic diet and the emerging evidence that ketone bodies appear to have an anti-inflammatory effect on the brain and thus have a potential to reduce migraines[1], I suggested that she give it a go. Knowing precisely when the headaches would appear, we used approximately a week lead in time, transitioning her from a 'normal diet' into ketosis. After playing around a lot with all the variables, meals choices and exercise options, this is what we have found expedites the entry into ketosis:

Approximately a week before the onset of headaches:

- She starts the day with a ketone rich drink. This is 250g plunger coffee with 30g of MCT and 30g of grass-fed unsalted butter. Ketone beverages have been studied in the context

[1] Effectiveness of ketogenic diet in treatment of patients with refractory chronic migraine https://pubmed.ncbi.nlm.nih.gov/33527209/

of healthy brain ageing by Stephen Cunnane, and his group have shown elevation of brain ketone uptake and associated reduced brain inflammation with MCT rich drinks[2].

- 60 minutes of Zone 2 aerobic exercise on the stationary bike. In the absence of any physiological testing data, we use the 180-age heart rate formulae proposed by Phil Maffetone[3] as a proxy for Zone 2, and she spend an hour each morning in the fasted state.
- The ketone rich drink normally serves as breakfast and then around 11am she will have an early lunch. This usually consisted of a mixed leaf or coleslaw salad with oysters or other fatty fish and nuts, seasoned with olive oil, vinegar, wasabi and some home-made fermented chilli sauce. Dinner is based around a fatty cut of meat: lamb shoulder, pork belly, beef chuck etc that is either roasted, turned into a coconut milk-based curry or a bolognaise/ragu and that is normally served with steamed vegetables, salad or both.
- Red wine, fruits, rice, flour-based products and treats are held back for the approximately 2 weeks she is in ketosis. We occasionally put the meals into a calorie and macronutrient counter and is roughly 1700-2000 calories, depending on a weekday (a little tighter) or a weekend (a little looser) with a split being around 70% fat, 20% protein and 10% carbohydrate or thereabouts.

Early on as we were working out what was working the best, she was regularly testing blood ketone levels several times a day. This approach above achieves blood ketone levels in excess of 2 mmol/L by day 5 (the highest she has seen has been over 3 mmol) and virtually always completely eliminates the headaches. Because she enjoys carbohydrate-based meals, she has chosen a cyclical approach to ketosis, where approximately just over 2 weeks is spent on a conventional diet and just under 2 weeks on a ketosis. Once her cycle commences, she allows two or so days to remain in ketosis, going by her female intuition before she transitions back out again.

Exiting ketosis required some perfecting to avoid getting a glucose spike and risking a potential delayed headache. On the first day that she reintroduces carbohydrate, she enjoys a bowl of high fibre oat-based cereal then completes her standard 60-minute cycling session. The muscle contraction increases the glucose transport machinery and insulin sensitivity[4] and that appears to be the best transitional step she has taken so far.

In a nutshell, fortnightly cycling ketosis, ketone rich morning drinks and daily moderate intensity aerobic exercise has rendered the need for supplements and medication completely unnecessary and has provided her with years of headache free cycles[5].

We have found that as the months have passed, using the cyclical fortnightly approach to ketosis, the easier it has been to enter and sustain blood ketone levels ~2mmol/l within

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[2]For example, A ketogenic drink improves cognition in mild cognitive impairment: Results of a 6-month RCT https://pubmed.ncbi.nlm.nih.gov/33103819/

[3] Maximum Aerobic Function: Clinical Relevance, Physiological Underpinnings, and Practical Application https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7142223/

[4] Exercise & GLUT4 https://pubmed.ncbi.nlm.nih.gov/32568924/

[5] On occasions, an unplanned headache will arise mid cycle. This has proven impossible to predict. She normally uses pain medication in conjunction with a ketone-rich drink and aerobic exercise to increase ketones back up to a level that the headache is eliminated.

days. I assume once the ketotic pathways have been developed in muscle, 2-weeks every month is sufficient to keep them 'active'. One final interesting observation is that we avoid resistance training on the day that she expects a headache. The transient increase in blood glucose levels during and after the session have been enough to acutely lower the ketones and a headache has caught her by surprise, so we play it safe and avoid lifting weights in the 'danger zone'.

We hope this article might provide some options, ideas and relief for those are inflicted with menstrual migraines and encourage everyone to let us know your feedback if you have tried this approach. We would suggest that you be patient in trying the approach the first few months, as it takes time to get the ketone levels up. Use a blood ketone monitor to test the levels and if you are unfamiliar with ketogenic diets, Dr. Dominic D'Agostino has some great resources[6].

By Dr Tony Boutagy

Tony has a PhD in sports science and works as a strength coach and educator in the fitness industry.

Conflict of interest
Tony declares that he has no conflict of interest regarding any information in this article. Tony is not a medical doctor and any information contained above does not constitute medical advice. Please consult your doctor when attempting to treat your headaches.

[6] https://ketonutrition.org