

# Ketogenic Diet Stops Seizures in Their Tracks for a 44 Year Old Ontario Woman

## A Case Study

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### BEFORE

Prior to Ketogenic diet:

ISSUES BEING TREATED: Epilepsy, Fibromyalgia, Osteoarthritis

MEDICATIONS: Naproxen, Flexeril, Keppra

PAIN: Constant/daily

COMPLAINTS: Seizures, pain, difficulty sleeping, constantly cold, joint pain, hair loss, fatigue, memory issues

QUALITY OF LIFE: Impaired, no license, work/ engagement with community/sport/social activities compromised

WEIGHT: 250 lbs



### INTRODUCTION/ DIAGNOSTICS

- Client presented with previous history of simple partial seizures with one generalized major seizure at age 14
- Diagnosis was in keeping with left temporal lobe epilepsy
- Carbamazepine had been used from 1984 and discontinued in 1988
- No family history of seizures
- Seizure free for 30 years until July 2014.
- Jul 2014: Physical exam was normal
- Jul 2014: All blood work normal
- Jul 2014: started on Keppra 500 mg/day titrated up to 3000 mg/day over 90 days
- Sept 2014: EEG findings on medication: Mildly abnormal. Shows low background with some left temporal lobe slowing.
- Sept 2014: MRI: Normal/ Unremarkable study.
- October/Nov 2014 : Began therapeutic Ketogenic Diet
- Mid Nov all seizures had stopped
- March 2015: Video Intensive EEG (5 months after initiating Ketogenic diet) : Mildly abnormal EEG due to a few sharp waves and some lateralized slowing in the left frontotemporal area. This suggests a possible focal lesion in that area. A few sharp waves are minimally suggestive of epileptic potential.

### NMR LIPOPROFILE AUG 2016

		Reference Range
LDL Particle Number	840	<1000
LDL-C	101	0-99
HDL-C	88	.39
Triglycerides	63	0-149
HDL-P	33.2	>=30.5
Small LDL-P	>90	<=527
LDL Size <b>Large (Pattern A)</b>	21.7	>20.5

### EARLY MANAGEMENT

Patient started on 500 mgs Keppra and titrated up to 3000 mg /day over 90 days. With each dosage increase seizure length and symptoms became worse. Seizures became more generalized, post ictal phase lasted longer.

Side effects experienced included:

Emotional: Tearfulness; uncharacteristic bouts of anger

Physical: Fatigue, brain fog ; dizziness

Psychological: Depression; profound sadness; agitation

Below is a table which illustrates seizure frequency by week beginning with the first seizure the week of July 14<sup>th</sup> 2014

WEEK	1	2	3	4	Total	Keppra mgs/day
Jul 2014			5	3	7	500
Aug 2014	4	2	3	6	15	1000-1500
Sep 2014	0	0	7	3	10	2000-2500
Oct 2014	1	0	20	20	40	3000 Keto
Nov 2014	22	0 First BHB above 1 mmol/L	0	0	22*	3000 - 1000 Keto
Dec 2014	0	0	0	0	0	500 Keto
Mar 2015	0	0	0	0	0	500 Keto
Mar 2016	0	0	0	0	0	250 Keto

### INTERVENTION

On Oct 23<sup>rd</sup> Patient began a self regulated ketogenic diet comprised of approx. 20-25 grams total carbohydrate: 140gms fat and 40-60gms protein. Patient had baseline blood work done and took Beta-Hydroxybuterate and fasting glucose levels daily for 600 days. A careful food log was kept. AM fasted BHB levels were kept between 1.5 and 3 mmol/L. After one year total carbs were increased to 50 with net carbs under 30. This resulted in a decrease in fasting BHB to between 1-2 mmol/L with no adverse effects.

### KETONE/BG CHART



Note\* a correlation was found between higher ketones and lower BG most marked at time of ovulation and the reverse just at onset of menstruation all while dietary macros remained constant. Above is sample A-M-J 2015

### AFTER

After 22 months on a Ketogenic Diet

ISSUES BEING TREATED: None

MEDICATION: None  
SUPPLEMENTS: Potassium; Magnesium; CoQ10; B6

PAIN: Rare

COMPLAINTS: Resolved. no seizures better energy, memory, and sleep

QUALITY OF LIFE: Excellent, drivers license restored, working full time, engaged in community, sport and social activities

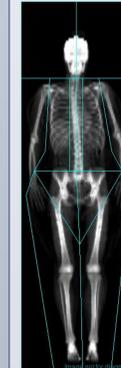
WEIGHT: 175 lbs



### LAB / DEXA results

Sept 2014 indicates baseline numbers before onset of Ketogenic Diet.

	Sep-2014	Mar-2015	Jun-2015	Sep-2015	Mar-2016	Sep-2016
HbA1c	6.2	5.4	4.6	5.2		5.2
Tri	1.08	.83	.82	.80	.67	.63
HDL	1.35	1.69	2.27	1.95	2.34	2.6
LDL	2.65	2.43	2.13	2.38	2.35	2.25
TC/HDL	3.4	2.8	2.1	2.4	2.1	2.0
eGFR		87	92	94	94	90
ALT*	44					16
T-Score			1.1			2.3
Urate*		351	493	443	275	327
Weight	250	215	211	198	186	175



In the one year between DEXA scans patient lost 40 lbs of body fat and gained 4 Lbs of Lean Body Mass

\*Note ALT was measured in Nov of 2014 after 4 months of Keppra usage.  
\*Urate was high when patient was supplementing with Vitamin C 1000mg per day as per dieticians request. High levels resolved when patient stopped supplementing and added organ meat and 30gms red pepper/week

### PATIENT INSIGHTS

When I learned of ketogenic dietary therapy and presented the concept to my care providers I was disappointed with their responses. My neurologist stated categorically that it "only works for kids". My family Dr. had never heard of it and was "very concerned about the level of fat" I was consuming. Ultimately both became very supportive. I struggled to find local knowledgeable support. I learned how to get the best results from studies on line and reaching out to communities such as **The Charlie Foundation and Matthews Friends**, without whom I do not think I would have had the success I have had. Had I not been in a position to educate myself (and my primary caregivers) I would not be enjoying the quality of life I have today. A Ketogenic dietary approach may not work for everyone but everyone deserve the option. GS

### ONTARIO PROVINCIAL GUIDELINES FOR THE MANAGEMENT OF EPILEPSY IN ADULTS AND CHILDREN

- It is recommended that children, young people and adults should be treated with a single AED (monotherapy) whenever possible.
  - If the initial treatment is unsuccessful, then monotherapy using another drug or add-on treatment with a second drug can be tried.
  - If the second drug is unhelpful, either the first or second drug may be tapered, depending on relative efficacy, side effects and how well the drugs are tolerated before starting another drug. Some patients are required to be on more than 2 AEDs.
  - It is recommended that combination therapy (adjunctive or 'add-on' therapy) should only be considered when attempts at monotherapy with the tolerated dose of AED have not resulted in seizure freedom.
  - AED interactions and comorbidities should be taken into consideration when choosing combination therapy.
  - If there is no improvement after two adequate trials of AEDs, the patient should be referred for epilepsy surgery evaluation.
- \*There is no mention of Ketogenic dietary therapy as a treatment option for children or for adults in either the treatment section or the patient education and counselling sections of this resource.

\* Epilepsy Implementation Task Force Version 1.0 | Critical Care Services Ontario | January 2015

### RECOMMENDATIONS

The Ontario guidelines be amended to include ketogenic dietary therapies as a treatment option either as a stand alone or an adjunct therapy.

That patient education and counselling materials include information on ketogenic dietary therapies.

That guideline criteria be developed for routine bloodwork for those following a ketogenic diet as well as information on interpreting that bloodwork for their physicians.

### CONTACT

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