Advances and Practical Application of The Modified Atkins Diet

Eric Kossoff, MD
Associate Professor, Pediatrics & Neurology
Johns Hopkins Hospital
June 13, 2011
Damn that Atkins!
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”? 
• How to do it 
• Myths 
• Side effects 
• Those crazy food labels 
• What’s new in 2011? 
  – KetoCal and other new research to come
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?

• How to do it

• Myths

• Side effects

• Those crazy food labels

• What’s new in 2011?
  – KetoCal and other new research to come
The Ketogenic Diet: Basics

• 90% calories are fat
  – 4:1 ratio of fat: carb+protein (grams) most common

• Fluid and calorie-limited
• Foods weighed on gram scales

• Typically started in the hospital over 4 days
  – 24-hour fasting period optional
• Mostly used for children
6-Month Seizure Reduction from Ketogenic Diet

- Seizure-free: <50%
- 90-99%
- 50-90%
An Easier Diet for Epilepsy Patients

Bissett Schwanke first noticed that her 4-year-old daughter, Genevieve, was having tics in January 2004. Then, after she had scheduled an appointment with her pediatrician, she saw something new—a seizure. Visits to a local neurologist and tests confirmed her worst fears—Genevieve had childhood epilepsy.

“It was pretty devastating,” Schwanke says. “It snowballed from head nods to four to six seizures a day.”

On top of that, the prescribed drug therapy seemed to have no effect. Anti-epileptics take months to take hold therapeutically, she was told. But when Genevieve’s seizures became even more frequent and intense in the spring of 2005, Schwanke consulted with Hopkins neurologist Eileen Vining. But Vining saw some improvement in Genevieve’s seizure control and recommended that she stay with the drug therapy. Give it a real opportunity to work, and then consider other options.

Schwanke knew that the high fat/low carbohydrate ketogenic diet was effective in controlling epilepsy, but it had its drawbacks, including a required fast and a hospital stay during which families are trained in the rigors of the diet. Side effects include kidney stones, constipation and stunted growth. When she returned to Hopkins, Vining told her about a less-restrictive, modified Atkins diet that also produces ketones—a chemical by-product of fat that can inhibit seizures—but requires fewer restrictions on calories, fluids and proteins, and no fast or hospitalization. Also, Hopkins pediatric neurologist Eric Kossoff was conducting a small pilot study of this diet. When Schwanke still saw no success with the anti-epileptics by the fall, she enrolled Genevieve in the six-month study. The results were astounding. “Within 36 hours she did not have another seizure, and she’s remained seizure free,” Schwanke says. “It was a complete miracle. We did not expect that kind of response.”

In Kossoff’s study, presented at a Hopkins neurology conference and a meeting of the American Epilepsy Society last December, 13 of 20 patients had a greater than 50 percent improvement in seizures, and seven had a greater than 90 percent improvement. In addition to Genevieve, three other patients were seizure free. Nearly half were able to reduce or completely discontinue medications. Also, side effects were low.

“Our findings suggest relatively good efficacy compared to the ketogenic diet,” Kossoff says. “Our study wasn’t large enough to say a modified Atkins diet should replace the ketogenic diet, but the results are encouraging and intriguing.”

Schwanke couldn’t agree more: “The meds wore her out. Now she’s active, goes to school, plays with her friends. It’s like we turned a page and got our child back.” For more information, call 410-614-6054.
"No thanks, I'm on a low carb diet."
History of the “MAD”

• 2001: parents of patients on the ketogenic diet very long periods able to “wing it”…
History of the “MAD”

• 2001: parents of patients on the ketogenic diet very long periods able to “wing it”…

  – Dr. Atkins dies in a tragic accident April 8
History of the “MAD”

• 2001: parents of patients on the ketogenic diet very long periods able to “wing it”…

  – *Dr. Atkins dies in a tragic accident April 8*

• Case series of 5 patients: Dec 2003

---

*Efficacy of the Atkins diet as therapy for intractable epilepsy*

Eric H. Kossoff, MD; Gregory L. Krauss, MD; Jane R. McGrogan, RD; and John M. Freeman, MD
History of the “MAD”

- 2001: parents of patients on the ketogenic diet very long periods able to “wing it”…

  - *Dr. Atkins dies in a tragic accident April 8*

- Case series of 5 patients: Dec 2003

- Robert Atkins Foundation funds first formal pediatric MAD trial – Sept 2003- May 2005
115 (42%) of 272 children and adults with >50% seizure reduction to date
– 26 (10%) became seizure-free

Are these diets alike? YES!!!

- Low carbohydrate, high fat diet with similar foods
- Can be used long-term
- Weight loss can occur
- *Induces urinary ketosis*
Are these diets different? YES!!!

- No calorie restriction
- No fluid restriction
- No hospital admission (taught in clinic)
- No weighing of foods on gram scales
- No fasting required
- Parents can do it with their child
How is it “modified”? 

Atkins “by the book”
- High fat foods are allowed

Modified Atkins
- High fat foods strongly encouraged
How is it “modified”?

Atkins “by the book”

• High fat foods are allowed

• Carbs 20 grams per day just 1st 2 weeks

Modified Atkins

• High fat foods strongly encouraged

• Carbs 10-20 grams per day indefinitely
# How is it “modified”?

<table>
<thead>
<tr>
<th>Atkins “by the book”</th>
<th>Modified Atkins</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High fat foods are allowed</td>
<td>• High fat foods strongly encouraged</td>
</tr>
<tr>
<td>• Carbs 20 grams per day just 1\textsuperscript{st} 2 weeks</td>
<td>• Carbs 10-20 grams per day indefinitely</td>
</tr>
<tr>
<td>• Weight loss is the goal – watch calories</td>
<td>• Weight loss not the goal – eat ad lib</td>
</tr>
</tbody>
</table>
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?

• How to do it

• Myths

• Side effects

• Those crazy food labels

• What’s new in 2011?
  – KetoCal and other new research to come
“Modified Atkins Diet 101”
Month One

• Baseline CMP, CBC and lipid profile
• Send a 2-day food record before starting
• Go shopping (and surfing)

• Take a daily multivitamin and calcium
• 10 grams of any carbohydrates per day
  – 15 g/day for teens; 20 g/day for adults
• Eat lots of high fat foods, plenty of carb-free fluids

• Check ketones twice weekly; weight weekly
• Leave medications unchanged
• Avoid low-carb store products first month
• Call your keto team in one month for an update
SECTION IV: Modified Ketogenic Diets
17. When and Why Should I Use Alternative Diets? 193
18. The History of the Modified Atkins Diet for Epilepsy (and Future Directions) 197
19. How Do I Use the Modified Atkins Diet? 205
20. The MCT Ketogenic Diet 215
21. The LGIT (Low Glycemic Index Treatment) 219

SECTION V: Ketogenic Cooking
22. Sample Meal Plans for the Ketogenic Diet 227
23. Modified Atkins Diet Recipes 257

SECTION VI: The Future of Diets and the Brain
24. Can the Diet Be Used Before Medications? 273
25. Adults and Diets 277
26. Diets and Other Neurologic Conditions 281

SECTION VII: Appendices
A. Medications and Keto-Friendly Products 289
B. Sample Letter of Medical Necessity for Ketogenic Diet Formulas 297
C. Atkins Carbohydrate Gram Counter 299
D. Physicians Providing the Ketogenic Diet Worldwide as of November 2010 303
E. Modified Atkins Diet Sample Meals 323
F. Routine Ketogenic Diet Lab Studies for Children on the Diet 325
G. Selected References 327
<table>
<thead>
<tr>
<th></th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bacon</td>
<td>Ham &amp; Cheddar Cheese Omelet</td>
<td>Half &amp; Half</td>
<td>Vegetable &amp; Mozzarella Cheese</td>
<td>Fried Eggs</td>
<td>Grilled Ham Steak</td>
<td>Steak &amp; Eggs</td>
</tr>
<tr>
<td></td>
<td>Scrambled Eggs</td>
<td></td>
<td>Sausage Links</td>
<td>Cheese Omelet with Green</td>
<td>Poached Eggs</td>
<td>Scrambled Cheese Eggs</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fried Eggs</td>
<td>Peppers and Mushrooms</td>
<td>Tomato with Cheddar Cheese</td>
<td>with Cheddar Cheese</td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td>Water</td>
<td>Club Soda</td>
<td>Water</td>
<td>Water</td>
<td>Club Soda</td>
<td>Diet Soda</td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Roast Chicken breast</td>
<td>Fried Chicken Wings</td>
<td>Bunless Double Cheeseburger</td>
<td>Shrimp &amp; Scallops</td>
<td>Chicken Cobb Salad - Chicken</td>
<td>Sautéed Beef &amp; Vegetables</td>
<td>Braised Short Ribs</td>
</tr>
<tr>
<td></td>
<td>Salad – Romaine lettuce,</td>
<td>Celery Sticks</td>
<td>Lettuce</td>
<td>Steamed Snow Peas</td>
<td>Breast, Romaine lettuce,</td>
<td>(Green Peppers &amp; Mushrooms)</td>
<td>Salad – Romaine lettuce,</td>
</tr>
<tr>
<td></td>
<td>cucumber, mushrooms &amp;</td>
<td>Blue Cheese dressing</td>
<td>Tomato</td>
<td></td>
<td>Cucumber, Boiled Egg, Boiled</td>
<td></td>
<td>tomato, alfalfa sprouts &amp;</td>
</tr>
<tr>
<td></td>
<td>Italian dressing</td>
<td></td>
<td>Mayonnaise</td>
<td></td>
<td>Egg, &amp; Blue Cheese dressing</td>
<td></td>
<td>Blue Cheese dressing</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td>Diet Soda</td>
<td>Water</td>
<td>Diet Soda</td>
<td>Water</td>
<td>Club Soda</td>
<td>Club Soda</td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Broiled Salmon</td>
<td>Sirloin Steak</td>
<td>Fried Pork Chops</td>
<td>Seared Tuna Steak</td>
<td>Diet Soda</td>
<td>Roast Duck</td>
<td>Grilled Sea Bass</td>
</tr>
<tr>
<td></td>
<td>Steamed Broccoli with</td>
<td>Salad – Romaine lettuce,</td>
<td>Roasted Turkey Breast</td>
<td>Spinach Salad with</td>
<td>Diet Soda</td>
<td>Steamed Asparagus</td>
<td>Steamed Spinach</td>
</tr>
<tr>
<td></td>
<td>Cheddar Cheese</td>
<td>bacon bits, 1 boiled egg &amp;</td>
<td></td>
<td>Mushrooms &amp; Italian dressing</td>
<td>Diet Soda</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Italian dressing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Carbs</strong></td>
<td>15 g</td>
<td>13 g</td>
<td>12 g</td>
<td>12 g</td>
<td>12 g</td>
<td>12 g</td>
<td>13 g</td>
</tr>
</tbody>
</table>
Atkins Recipes - Course

Main Course
- Chard and Cheese Casserole

Grains & Breads
- Chard and Cheese Casserole

Desserts
- Chocolate Sour Cream

First Course
- Creamy Chicken and Vegetables

Appetizers
- Chile Beef Kabobs

Beverages
- Chocolate Mousse

CARB COUNTER
Use the handy Carb Counter tool to quickly count the Net Carbs in your favorite foods.
ABOUT US

Introduction
Our Mission
Our Patron
Board of Trustees
Medical Board

THE DIET

Classical and MCT Keto Diet
Atkins Diet for Adults and Children
Low GI Diet

MEDICAL SECTION

Introduction
Dr Helen Cross
Dr Ruby Schwartz
Liz Neal
Carrie Loughran

Meet Our Christmas Keto Kid!!

The Ketogenic Diet
A Brighter Future For Childhood Epilepsy

10th May 2008!
NEW! KetoCal® Recipes

Snacks and Dessert

- Hot Cocoa
- Bullding with Heavy Cream
- Plain Mousse
- Pudding
- Chocolate Muffins
- Almond-Coconut Cookies
- No Bake Fudge
- Chocolate Almond Bark
- Cranberry Apple Crisp
- Chocolate Rumcake Pie
- Mincemeat Cookies
- Chocolate Cake with Chocolate Cream Frosting
- Smoothies - Raspberry, Blueberry and Banana
- Raspberry Smoothie
- Paleo Cookies with Whipped Cream All-tale
Modified Atkins Diet

What is the modified Atkins Diet?
The modified Atkins diet is a modification of the traditional ketogenic diet that has been used for several years by families mostly who had been using the ketogenic diet for many years and eventually stopped weighing and measuring foods. They had noticed ketones still remained high and seizures under control. It was first formally studied in children and adults who had never tried the ketogenic diet at Johns Hopkins Hospital by Dr. Eric Kossoff and colleagues in 2003, with the first paper published in 2003. A larger series of 20 children was published in December 2005.

How is it different from the ketogenic diet?
Although the foods are very similar, there are key differences between the modified Atkins diet and the ketogenic diet. First, with the Atkins diet there is no fluid or calorie restriction. Also, although fats are strongly encouraged, there are no restrictions on proteins. In addition, foods are not weighed and measured, but carbohydrate counts are monitored by parents and patients. It is started outside of the hospital, without a fast, as well. Lastly, foods can be eaten more freely by restaurants and outside the home, and families (and neurologists) can do it as well. The diet is a "modified" Atkins diet as it allows for less carbohydrates than traditional Atkins (10-20g/day) and more strongly encourages fat intake. Please remember that no diet should be done without a neurologist and dietitian involved.

Who will it help?
At this time, research is underway to help answer this question. Preliminary results in a small number of patients suggest that the modified Atkins diet may help some children with intractable epilepsy.
Welcome to Atkins For Seizures

The Zkriss Hopkins Pediatric Neurology Center has long supported secure management through Diet. The ketogenic diet has saved the lives of many and improved the lifestyle of countless more. This intensive diet is very high in fat, and low in carbohydrates (low-carb). In this, it resembles Dr. Atkins low carb diet designed for both weight loss and healthy living.

After four years and six different anti-seizure medications that didn't help our daughter, we discovered Dr. Eric Kocott and the Atkins Diet for Seizures. Our daughter became patient number thirteen in a study that ended in April, 2005. She is now medication free. She has approximately 15 seizure days a year - down from 100 per day while on medication.

While Atkins for Seizures will not work for everybody, I believe this information needs to be made available to the medical community as soon as possible. There is also a need for centralized sharing of recipes, references, financial assistance, low-carb/keto-friendly suppliers, etc. Welcome to that place. It is our goal to provide support to families looking for more information.

One thing you will not find here is medical advice. We are families that have benefited from this approach - not pediatric neurologists. We will share our experiences and resources, but each child is different. Please seek qualified medical guidance. Dr. Eric Kocott is an excellent resource and may be able to assist you in finding the guidance.

Finally, this is a work in progress - as is the therapy. You can make a huge difference in the lives of many by contributing to this project. Please click the Contribute link on the left for a list of over ten ways you can help make this the resource it is meant to be.
RUTABAGA CHIPS

You can use turnips for these, too, or probably any root vegetable. I used a small Rutabaga. Peel and slice. Heat Oil in a deep pot and add a few inches of oil – enough to deep-fry, but not too much. Place rutabaga slices into hot oil and fry until golden brown. You can [...] 

ALMOND BUTTER BREAD

I made this recipe which I found through another MAD family on the Actors for Sasmara Yahoo Group. It is a fantastic substitute for bread – the best I have found so far. The texture is unlike many of the nut flour breads, as it holds together when cut and can be used for sandwiches, [...] 

PAN FRIED "NOODLES"

Cassy was exposed to noodles at a young age. Many of his friends are Korean, Chinese or Japanese and have shared various noodle dishes with him over the years. He was really devastated when he found out he could no longer have the beloved dish. So, we were so excited when we found the recipe [...]
Healing Young Hearts

Dietary Therapy for Epilepsy: A Parent’s Experience

Foods That Heal

Using the Modified Atkins Diet for Seizures

By Joanne Ritter

Most likely if you are reading this, you are either a parent of a child with epilepsy, or have a family member or friend with the condition. Perhaps you suffer from seizures yourself. Some people have milder forms of epilepsy and experience seizures only once or twice a year. Other epilepsy patients experience hundreds of seizures per day. In China, where I live, over 9 million people currently suffer from epilepsy. Thirty percent of patients experience seizures that cannot be controlled by medication.

Please understand, I am not a doctor. I can’t give you medical advice, and you will need to work with a qualified neurologist to find the right treatment. However, because the Modified Atkins Diet (MAD) is a newly introduced therapy in China, I hope that by sharing about our personal experience using it, other parents will find some of the answers they’re seeking.
How to check ketones

- Purchase *KetoStix*
- Dip the reagent end of the strip into urine specimen collected in a clean cup.
- In 10-15 seconds, check color against color chart
- Check twice a week
# Modified Atkins Diet Seizure Calendar

**PLEASE TRACK**
- Your seizures daily
- Your urine ketones twice a week for the first month, then weekly
- Your weight weekly

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ex: Sun**
- 21
- 160 lbs.
- Moderate
- No seizures

Please fax this calendar at the end of every month to 410-502-2507, “Attention– Dr. Cervenka”
"Modified Atkins Diet 101"
Month 2+

- 15-25 grams of carbohydrates per day
- Don’t need to check ketones regularly
  - Once per week is OK
- Check weight weekly
- Can reduce medications if desired
- Start using low-carb store products if desired
- Visit and labs at 3-4 months if it’s helping
How long should a child stay on the diet?

• As long as necessary!!!!

• Think of your own personal goals and expectations
  – Less seizures?
  – Fewer medications?
  – Milder seizures (less ER visits)?
  – Weight loss?
  – Driving?

• Usually after 2 years, we’ll try to wean the diet
  – Not necessarily true for teens and adults
High-Fat Ketogenic Diet Diminishes Seizures For Local Man With TSC
Originally published June 24, 2008

By Susan Guynn
News-Post Staff

New Market -- Joedy Atkinson eats chunks of butter and drinks heavy cream at every meal.

It's part of a special diet he's followed most of his 28 years. His mother, Eva Atkinson, is certain Joedy's high-fat diet is responsible for diminishing multiple daily seizures to a total of about 25 during the past 23 years.

At 3 1/2 months, Joedy began having seizures. He was diagnosed with epilepsy.

"Around 9 months, we noticed he wasn't progressing," said Eva. "His gross motor skills were fine," but when it came to making eye contact and speech, Joedy was lagging.

Further testing showed Joedy also had a genetic disorder called tuberous sclerosis complex (TSC). It causes benign tumor-like tubers to form in different organs, primarily in the brain, eyes, heart.

Eva Atkinson measures out meals for her son Joedy, 28, who has tuberous sclerosis and epilepsy. Eva says following a strict ketogenic diet for the past 23 years has reduced Joedy's seizures from multiple daily to about 25 since he began the diet around age 5.
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?
• How to do it
• Myths
• Side effects
• Those crazy food labels
• What’s new in 2011?
  – KetoCal and other new research to come
Things I’ve heard lately that aren’t necessarily true…

• Adults will not be compliant with the MAD
• If you’re not doing well, cut your daily carb count
• A meal plan with recipes is needed
• If the MAD doesn’t work, it doesn’t mean the KD won’t work – try it
• The MAD makes medications more potent/toxic – get rid of them to make it work
• Fruits are not allowed
• Splenda/Nutrasweet is not allowed
• There are less side effects than the KD…
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?
• How to do it
• Myths
• Side effects
• Those crazy food labels
• What’s new in 2011?
  – KetoCal and other new research to come
The Ketogenic Diet: An Effective Medical Therapy With Side Effects


Food for Thought: The Ketogenic Diet and Adverse Effects in Children

Side Effects: MAD

- Constipation*
- Weight loss
- Decreased vitamins and calcium → daily vitamin supplements
- Acidosis and over-ketosis*
  - Lightheadedness, dizziness, nausea, stomach ache, headache, fatigue → drink orange juice
- Kidney stones*
- Hyperlipidemia → monitoring of fasting lipids, decrease saturated fats

*make sure to drink plenty of fluids and avoid dehydration
<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6 months</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>34.0</td>
<td>33.7</td>
<td>0.96</td>
</tr>
<tr>
<td>ALT</td>
<td>21</td>
<td>26</td>
<td>0.30</td>
</tr>
<tr>
<td>AST</td>
<td>27</td>
<td>28</td>
<td>0.54</td>
</tr>
<tr>
<td>CO$_2$</td>
<td>23</td>
<td>22</td>
<td>0.36</td>
</tr>
<tr>
<td>BUN</td>
<td>12</td>
<td>17</td>
<td>0.01</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.5</td>
<td>0.5</td>
<td>0.92</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>192</td>
<td>221</td>
<td>0.06</td>
</tr>
<tr>
<td>HDL</td>
<td>65</td>
<td>69</td>
<td>0.79</td>
</tr>
<tr>
<td>LDL</td>
<td>108</td>
<td>130</td>
<td>0.15</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>82</td>
<td>84</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?
• How to do it
• Myths
• Side effects
• Those crazy food labels
• What’s new in 2011?
  – KetoCal and other new research to come
The Food Label – Nutrition Facts

- Serving Size
- Servings per container
- Carbohydrate
- Subtract Fiber ONLY
- Include sugar alcohols in carb count
**Ingredients**: Soybean oil, eggs, water, distilled and cider vinegar, salt, oleoresin paprika, natural flavors, calcium disodium EDTA added to protect flavor. Contains: Eggs

**Nutrition Facts**

<table>
<thead>
<tr>
<th></th>
<th>Amount/serving</th>
<th>%DV*</th>
<th>Amount/serving</th>
<th>%DV*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serving Size</strong></td>
<td>1 Tbsp (14g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calories</strong></td>
<td>100</td>
<td></td>
<td>Sodium</td>
<td>75mg</td>
</tr>
<tr>
<td><strong>Fat Cal.</strong></td>
<td>100</td>
<td></td>
<td>Total Carb.</td>
<td>0g</td>
</tr>
<tr>
<td><strong>Total Fat</strong></td>
<td>12g</td>
<td>18%</td>
<td>Dietary Fiber</td>
<td>0g</td>
</tr>
<tr>
<td><strong>Sat Fat</strong></td>
<td>1.5g</td>
<td>8%</td>
<td>Sugar</td>
<td>0g</td>
</tr>
<tr>
<td><strong>Trans Fat</strong></td>
<td>0g</td>
<td></td>
<td>Protein</td>
<td>0g</td>
</tr>
<tr>
<td><strong>Polyunsat Fat</strong></td>
<td>7g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monounsat Fat</strong></td>
<td>2.5g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cholesterol</strong></td>
<td>10mg</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Percent Daily Values (DV) are based on a 2,000 calorie diet

Vitamin A 0%  Vitamin C 0%  Calcium 0%  Iron 6%
TRADER JOSÉ'S
REduced Carb
Whole Wheat
Flour Tortillas

High in Fiber & Low Fat
No Artificial Colors, Flavors or Preservatives

NET WT.
9.8 OZ (280g)

For Extended Shelf Life, Please Refrigerate

Nutrition Facts
Serving Size 1 tortilla (28g)
Servings Per Container 10

Amount Per Serving
Calories 45
Calories From Fat 10
% Daily Value
Total Fat 1.5g 2%
Saturated Fat 0g 0%
Trans Fat 0g

Cholesterol 0mg 0%

Sodium 130mg 8%

Total Carbohydrate 10g 3%
Dietary Fiber 7g 28%

Sugars 0g

Protein 4g

Vitamin A 0%  Vitamin C 0%
Calcium 2%  Iron 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Reduced Carb Whole Wheat Flour Tortillas
Trader Joe's reduced carb tortillas have over 70% fewer carbs per serving than flour tortillas with whole wheat, and they're low in fat. Roll them up for mini-wraps. Try an open-faced quesadilla or complement your fajita menu ideas.

BACK OF PACKAGE

INGREDIENTS: WATER, WHEAT FIBER, WHEAT GLUTEN, WHOLE WHEAT FLOUR, OAT FIBER, HIGH OLEIC SUNFLOWER OIL, CONTAINS 2% OR LESS OF THE FOLLOWING: FOR ADDITION OF FRESHNESS (SALTED WHEAT FLOUR WITH ADDED VINEGAR AND/OR CULTURED WHEAT STARCH), CITRIC ACID, WHEAT BRAN, SALT, SOY LEICHTIN (AN EMULSIFIER), GUAR GUM, YEAST, SODIUM ALGINATE, SODIUM BICARBONATE, LEAVENING (SODIUM ACID PYROPHOSPHATE, SODIUM BICARBONATE, CORNSTARCH, MONOGLUCOSIDE, PHOSPHATE).
Topics

• History and concept behind the modified Atkins diet
  – Why do I call it “modified”?

• How to do it

• Myths

• Side effects

• Those crazy food labels

• What’s new in 2011?
  – KetoCal and other new research to come
KetoCal®

- Powdered or liquid formula with slight vanilla taste
- 4:1 ratio
- 2/3 of a cup powder + 8 oz of warm water will make a ~400 kilocalorie drink
  - Can be flavored
  - Better chilled
- Can be incorporated into recipes as a flour substitute, too
- Liquid has more convenience (recent survey)
Study Protocol

- 30 children
- Open-label, prospective design
  - Modified Atkins diet - 10 grams/day
  - Supplemental 60 g/day KetoCal®
    - Only for the first month
- Visits at baseline, 1 month, 2 months
- Labs, rating scale, food record at each visit

- Study funded by Nutricia
- Completed September 2009
- Published February 2011 in Journal of Child Neurology
Results: 1-month Outcomes

• 24 (80%) with >50% seizure reduction
  – Historical – 37 of 64 (58%) $p=0.03$

• 11 (37%) with >90% seizure reduction
  – Historical – 12 of 64 (19%) $p=0.05$

• No correlation with age, seizure type, frequency
• Slight correlation with male gender ($p=0.05$)
Results: 2-month Outcomes

- 21 (70%) with >50% seizure reduction
  - Historically – 38 of 79 (48%) $p=0.03$

- 13 (43%) with >90% seizure reduction
  - Historically – 15 of 79 (19%) $p=0.01$

- 8 of 30 (27%) had >25% increase in seizures between 1st and 2nd month
  - Historically, that occurred in 10 of 50 (20%), $p=0.39$
Tolerability

- Rating of MAD:  7.2 / 10

- KetoCal ®
  - Rating  5.3 / 10
  - 87% drank it as shakes
  - 47% chose to restart it after the study ended
Why did it work?

• No effect on ketosis or tolerability…but….

<table>
<thead>
<tr>
<th></th>
<th>MAD-KC</th>
<th>MAD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketogenic ratio</td>
<td>1.8:1</td>
<td>1.0:1</td>
<td>0.0002</td>
</tr>
<tr>
<td>Fat (grams)</td>
<td>195</td>
<td>114</td>
<td>0.0001</td>
</tr>
<tr>
<td>Carbohydrates (grams)</td>
<td>15</td>
<td>10</td>
<td>0.001</td>
</tr>
<tr>
<td>Protein (grams)</td>
<td>101</td>
<td>107</td>
<td>0.61</td>
</tr>
<tr>
<td>Calories</td>
<td>2.290</td>
<td>1.572</td>
<td>0.0008</td>
</tr>
</tbody>
</table>
• 27 patients from 4 countries
  • 10 (37%) had at least 10% improvement after making the switch to the full ketogenic diet
  • 5 became seizure-free – ALL had Doose syndrome…

• If the child was not better at all with MAD…they did not get better with the KD
• Suggests the KD is a “higher dose” of dietary treatment
SHORT COMMUNICATION

A pilot study of the modified Atkins diet for Sturge–Weber syndrome

Eric H. Kossoff\textsuperscript{a,b,c,*}, Jennifer L. Borsage\textsuperscript{a,b,c}, Anne M. Comi\textsuperscript{a,b,c}

\textsuperscript{a} The John M. Freeman Pediatric Epilepsy Center, Department of Neurology, Johns Hopkins Medical Institutions, Baltimore, MD, United States
\textsuperscript{b} The John M. Freeman Pediatric Epilepsy Center, Department of Pediatrics, Johns Hopkins Medical Institutions, Baltimore, MD, United States
\textsuperscript{c} The Hunter Nelson Kennedy Krieger Sturge Weber Center, Kennedy Krieger Institute, Baltimore, MD, United States

Received 13 July 2010; received in revised form 22 August 2010; accepted 13 September 2010
Use of the modified Atkins diet for adolescents with chronic daily headache

EH Kossoff¹, J Huffman², Z Turner¹ and J Gladstein³

Date received: 8 August 2009; accepted: 21 August 2009
Future projects

- Expanding the use of the MAD to resource-poor countries worldwide

- Adults
  - Adults via email contact only…

- Non-epilepsy uses
James Rubenstein MD
Adam Hartman MD
Patti Vining MD
Mackenzie Cervenka MD

Jennifer Bosarge RD
Bobbie Henry RD
Zahava Turner RD
Hannah Rowley RD

Susie Gingrich
Veronica Atkins
Steven Yanicelli

Mike Koski
Jeanne Riether
Crystal Armstrong
Annette Siefert