

## Type 2 Diabetes Nursing Guidelines based on Wave and Energy Theories Associated with Three Distinctive Postprandial Plasma Glucose Waveforms (GH-Method: Math-Physical Medicine)

Gerald C Hsu

eclaireMD Foundation, USA

### \*Corresponding author

Gerald C. Hsu, eclaireMD Foundation, USA, Email : g.hsu@eclairemd.com

Submitted: 17 Apr 2020; Accepted: 23 Apr 2020; Published: 29 Apr 2020

### Introduction

This paper summarizes tips and guidelines of optimized combination of food and exercise for type 2 diabetes (T2D) patients to control their glucoses. The dataset is provided by the author, who uses his own type 2 diabetes metabolic conditions control, as a case study via the “math-physical medicine” approach of a non-traditional methodology in medical research.

Math-physical medicine (MPM) starts with the observation of the human body’s physical phenomena (not biological or chemical characteristics), collecting elements of the disease related data (preferring big data), utilizing applicable engineering modeling techniques, developing appropriate mathematical equations (not just statistical analysis), and finally predicting the direction of the development and control mechanism of the disease.

### Method

The author has categorized postprandial plasma glucose (PPG) into three generalized waveform patterns from a total of 17,046 glucose data and 964 glucose waveforms, including 241 FPG (fasting plasma glucose) and 723 PPG.

In the first pattern, named as Himalaya, the glucose wave has risen to a peak within the first hour and then sustained on that plateau for the next 2 to 3 hours.

In the second pattern, identified as Grand Canyon, the glucose wave has reached to a high peak (crest) but then decayed very rapidly to a much lower valley (trough) and stayed at that level.

In the third pattern, called Twin Peak or even Triple Peak, the glucose wave has reached to its first peak within the first hour, then dropped to a trough; however, more peak(s) reappeared afterward within 2 to 3 hours timeframe.

These many of glucose peaks turn into “excessive left-over” energy which circulated inside of human body and damages internal organs. These damages eventually turn into many complications, including cardiovascular diseases (CVD), stroke, kidney failure, bladder infection, thyroid problems, eye problems, foot ulcer, and more.

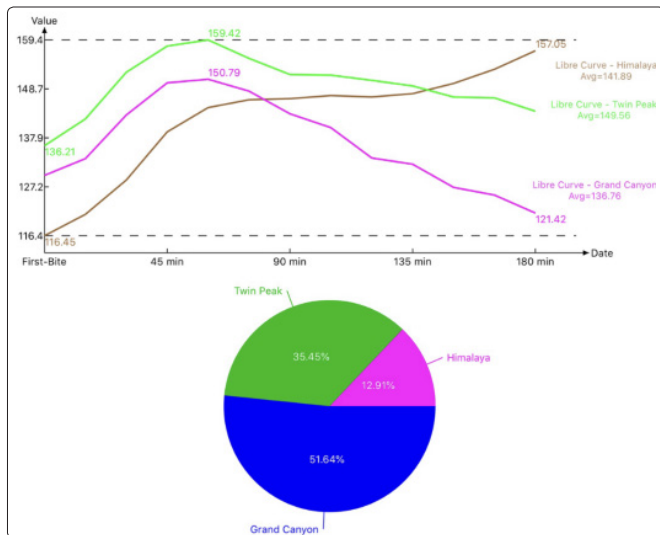
### Results

To reduce internal organ damages from those PPG peaks, a T2D patient can practice the following guidelines to control the PPG conditions which contribute about 70% to 80% of HbA1C formation:

1. Limit carbs/sugar intake amount within 15 grams approximately half size of your fist or palm. Do not eat or drink sweet items at all. If you still feel hungry after consuming 15 grams of carbs/sugar, then eat more vegetables and proteins.
2. You can follow this rule by replacing half-fist size of carbs/sugar with a full-fist size of vegetables (combination of various colors).
3. You can eat almost any amount of proteins, including egg white, white fish, and tofu; however, ketonic diet is not recommended because of the low-carb diet.
4. Avoid animal fat, red meat, salty diet, and preserved food to reduce the risk of having hypertension and hyperlipidemia. Don’t add more salt to your dishes since natural food materials already contain sufficient daily salt allowance.
5. Cut your fruit (e.g. an apple) into 3 pieces and eat them around 10am, 3pm, 9pm, respectively. Avoid eating overly sweet fruits, such as pineapple, banana, and grapes. Eat more berries, including strawberries, blackberries, and blueberries.
6. Exercise post-meal, preferring “normal-speed” walking. Need to start within 20 to 30 minutes after your first bite of food. If the situation allows, try to walk continuously for 40 minutes (approximately 4000 steps), even 1 to 2 hours (for a severe T2D patient), or at least 15 to 20 minutes (for a non-severe T2D patient). Simple walking brings benefits to your overall health.
7. Your intake amount of carbs/sugar will decide the peak’s height of your PPG waveform. The only way to reduce peak’s damage to your body is post-meal exercise.
8. Anyone can crave more carbs/sugar food, but if you eat too much carbs/sugar during any meal, then double your post-meal exercise time.
9. If you do not exercise after your meal (i.e. inactive), you will develop your PPG waveform into a Himalaya pattern. If you have insufficient amount of time for post-meal exercise, you will not be able to consume your infused energy. Therefore, you will have a Twin Peak PPG pattern which is the worst

kind. Both conditions are harmful to your health. The best way is to maintain a Grand Canyon PPG pattern by walking or exercising sufficiently after your meal. You could reduce the peak of the Grand Canyon by eating less amount of carbs/sugar during a meal.

10. You should always be aware of low blood glucose situations, especially during the night when you sleep and between meals, to prevent having insulin shock. You can put a piece of candy or chocolate by your bedside in case you need it at night. Usually, the lowest FPG period is between 3am to 5am when you are in deepest sleep.
11. Avoid dinning outside in restaurants as much as you can since the chef's main concern is to attract more customers by adding more sugar, salt, and fat into their cooking process.
12. Avoid eating any kind of processed food which usually contains excessive amount of sugar, salt, and fat. If you must eat processed food from supermarket or store, read its nutrition label first.
13. Traveling causes significant disturbance and impact on your stability of glucose and metabolism control. Therefore, you must try to bring your own food as much as you are allowed to and eat your regular amount at a fixed schedule. You must also try to exercise inside the airports, e.g. walk along the hallways near the boarding gate, as much as you can. However, you will be trapped in a confined space during flight.
14. To protect your heart, eat proper amounts of nuts and use olive oil if possible. You can also add flaxseed oil (rich in omega 3) on top of your salad, but do not fry your food using flaxseed oil.



**Figure 1:** Generalized Waveforms and Distribution % of Himalaya, Grand Canyon, & Twin Peak

## Conclusion

This big data analytics has analyzed and categorized complex PPG varieties into three distinctive generalized waveforms. Furthermore, the author has summarized a set of guidelines for T2D patients to follow in order to fine-tune and then control their PPG conditions via an optimized combination of diet and exercise.

## References

1. Hsu, Gerald C. (2018). Using Math-Physical Medicine to Control T2D via Metabolism Monitoring and Glucose Predictions. *Journal of Endocrinology and Diabetes*, 1(1), 1-6. Retrieved from <http://www.kosmospublishers.com/wp-content/uploads/2018/06/JEAD-101-1.pdf>
2. Hsu, Gerald C. (2018, June). Using Math-Physical Medicine to Analyze Metabolism and Improve Health Conditions. Video presented at the meeting of the 3rd International Conference on Endocrinology and Metabolic Syndrome 2018, Amsterdam, Netherlands.
3. Hsu, Gerald C. (2018). Using Signal Processing Techniques to Predict PPG for T2D. *International Journal of Diabetes & Metabolic Disorders*, 3(2),1-3. Retrieved from <https://www.opastonline.com/wp-content/uploads/2018/06/using-signal-processing-techniques-to-predict-ppg-for-t2d-ijdmd-18.pdf>
4. Hsu, Gerald C. (2018). Using Math-Physical Medicine and Artificial Intelligence Technology to Manage Lifestyle and Control Metabolic Conditions of T2D. *International Journal of Diabetes & Its Complications*, 2(3),1-7. Retrieved from <http://cmepub.com/pdfs/using-mathphysical-medicine-and-artificial-intelligence-technology-to-manage-lifestyle-and-control-metabolic-conditions-of-t2d-412.pdf>
5. Hsu, Gerald C. (2018). A Clinic Case of Using Math-Physical Medicine to Study the Probability of Having a Heart Attack or Stroke Based on Combination of Metabolic Conditions, Lifestyle, and Metabolism Index. *Journal of Clinical Review & Case Reports*, 3(5), 1-2. Retrieved from <https://www.opastonline.com/wp-content/uploads/2018/07/a-clinic-case-of-using-math-physical-medicine-to-study-the-probability-of-having-a-heart-attack-or-stroke-based-on-combination-of-metabolic-conditions-lifestyle-and-metabolism-index-jcrc-2018.pdf>

**Copyright:** ©2020 Gerald C Hsu. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.