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Viscoelastic or Viscoplastic Glucose Theory (VGT #149): Energy Analyses of a Total PPG Waveform from 2,020 Meals Versus Intermittent Fasting PPG Data from 542 IF Meals and Non-Intermittent Fasting PPG data from 1,478 Non-IF Meals by Applying 3 Different Energy Analysis Tools in the Time Domain, Space Domain, And Frequency Domain Of The Gh-Method: Math-Physical Medicine (No. 741)

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Introduction

This research report is 100% dependent on the author's developed VGT software tool.

The author received a news article copy from the Times daily in the UK (printed on 7/26/2022) from his MIT academic advisor, Professor Norman Jones. Here is the synopsis of this short article:

"Restricting eating to ten hours may control Diabetes: written by Eleanor Hayward, the Times daily news reporter

People with type 2 diabetes can control their blood sugar by only eating in a ten-hour window each day.

A study involved 14 people with type 2 diabetes, aged between 50 and 75, who were split into two groups for three weeks.

The first group limited their eating to between 8am and 6pm each day, and the other group ate over at least 14 hours a day. The group that ate only during the ten-hour window had lower blood sugar levels, and spent 15.1 hours a day in the normal blood sugar range compared with 12.2 hours for the others.

The researchers, from Maastricht University Medical Centre in Netherlands, said: "A daytime ten-hour time restricted eating regimen for three weeks decreases glucose levels and prolongs the time spent in the normal blood sugar range in adults with spreading food intake over at least 14 hours." The findings published in Diabetologist, add to evidence that type 2 diabetes can be partly controlled through diet not drugs.

Nearly five million people in Britain have diabetes, and rising obesity means one in ten adults are expected to have it by 2030. Nine out of ten people with diabetes have type 2, which is linked to obesity. Type 1 is an autoimmune condition usually diagnosed in childhood. It can lead to eye problems, amputation, and kidney failure.

Dr. Lucy Chambers, head of research communications at Diabetes UK, said: "This intriguing study shows that limiting normal food consumption to a ten-hour window during the day helped people with type 2 diabetes lower their blood sugar levels in the short term. This adds to emerging evidence that going for longer periods without eating, known as time-restricted eating, may benefit some people with certain metabolic health conditions. We look forward to larger and longer-term clinical trials to understand whether this style of eating can help manage their type 2 diabetes over the longer term."

As described in the Methods section, the author of this article is a 75-year-old male who has had type 2 diabetes (T2D) since 1995 when he was 48 years old. Here are ***his glucose readings in 2010: peak postprandial plasma glucose (PPG) 380 mg/dL, peak fasting plasma glucose (FPG) 180 mg/dL, and average daily glucose (eAG) 280 mg/dL with HbA1C value of 10%.*** Through a stringent lifestyle management effort, mainly diet and exercise, his T2D conditions were much better controlled by 2014. He ceased all diabetes medications on 12/8/2015. Here are ***his glucose readings during the COVID-19 period (~2.5-years from 1/19/2020 to 9/17/2022): averaged FPG 96 mg/dL, averaged PPG 108 mg/dL, and eAG 105 mg/dL with averaged HbA1C at 6.2% (without any diabetes medications).***

He initiated his intermittent fasting (IF) program on 11/8/2020 by skipping one meal per day for most of the days (542 IF days out of a total of 972 days, or 56%). The IF meals contain either water or tea only without any other solid food. His eating period within a typical day is 10 hours, starting from 7 am and ending at 5 pm, and he eats two meals within this 10-hours window. He has already written a few articles regarding his IF experimental results. ***In summary, his IF effort indeed helps both body weight reduction and glucose reduction, but only with some non-remarkable improvement percentages, around 10% or less.***

After reading the above-cited British article, he was inspired and decided to conduct another research task on the same subject of IF and glucose. His output symptom is the total PPG waveform from his 2,020 meals versus his two inputs: IF PPG input data from 542 IF meals and his non-intermittent fasting (Non-IF) PPG data from 1,478 meals from 11/8/2020 to 9/16/2022. ***In addition to the direct comparison of the average PPG amplitude values using traditional statistics tools, he goes further into the energy estimations using the math-physical medicine method which includes the time domain (TD), space domain (SD), and frequency domain (FD) tools.***

The most prominent finding of this research article is that the *average Non-IF PPG amplitude versus average IF PPG amplitude is 49% vs. 51% with a 6% amplitude difference. However, if he uses three energy approaches, his energy ratio comparisons are 47% vs. 53% from TD analysis with a 12% energy difference, 48% vs. 52% from SD analysis with a 6% energy difference, and 47% vs. 53% from FD analysis with 13% energy difference.*

In summary, although the 1 PPG amplitude difference and the 3 PPG energy differences are within a narrow range of 6% to 12%, the statement "intermittent fasting with eating food within a ten-hour window helps lowering blood sugar" is true.

Methods

The Author's Case of Diabetes and Complications

The author has been a severe T2D patient since 1996. He weighed 220 lb. (100 kg, BMI 32.5) at that time with a one-time glucose reading of 380 mg/dL. By 2010, he still weighed 198 lb. (BMI 29.2) with average daily glucose of 250 mg/dL (HbA1C of 10%). During that year, his triglycerides reached 1161b (hyperlipidemia) and albumin-creatinine ratio (ACR) at 116 (kidney issues). He also suffered from five cardiac episodes within a decade from 1993 through 2003 caused by work stress and diabetes. In 2010, three independent physicians warned him about his urgent need for kidney dialysis treatment and the risk of his life-threatening health situation such as dying from his severe diabetic complications. Other than the cerebrovascular disease (stroke), he has suffered most of the known diabetic complications, including both macro-vascular & micro-vascular complications, nerve damage as in retinopathy and foot ulcer, as well as a hormonal disturbance, e.g. hypothyroidism.

In 2010, he decided to launch his self-study on endocrinology, diabetes, and food nutrition to save his own life. After developing the metabolism model in 2024, during 2015 and 2016, he developed four prediction models related to diabetes conditions: weight, PPG, fasting plasma glucose (FPG), and A1C. As a result, from using his developed mathematical metabolism index (MI) model in 2014 and those 4 prediction tools, by end of 2016, his weight was reduced from 220 lbs. (100 kg, BMI 32.5) to 176 lbs. (89 kg, BMI 26.0), waistline from 44 inches (112 cm) to 33 inches (84 cm), average finger glucose reading from 250 mg/dL to 120 mg/dL, and lab-tested A1C from 10% to ~6.5%. ***One of his major accomplishments is that he no longer takes any diabetes medications as of 12/8/2015.***

Around that time (2014-2017), he started to focus on preventive medicine instead of blindly trusting and depending on medical treatments only. He also gambled on his belief that most human organs have the inherent ability to self-repair themselves through lifestyle improvements by taking good care of them - even though it can only accomplish a certain degree of repairing or healing dependent on different organ cells and their status of damage.

In 2017, he has achieved excellent results on all fronts, especially glucose control. However, during the pre-COVID period of 2018 and 2019, he traveled to approximately 50+ international cities to attend 65+ medical conferences and made ~120 oral presentations. This hectic schedule inflicted damage to his diabetes control, through dining out frequently, post-meal exercise disruption, jet lag, and along with the overall metabolic impact due to his irregular life patterns through a busy travel schedule; therefore, his glucose control and overall metabolism state were somewhat affected during this two-year heavy traveling period.

Since 1/19/2020, living in a COVID-19 quarantined lifestyle, not only has he written and published ~500 medical papers in 100+ journals, but he has also reached his best health conditions in the past 26 years. By the beginning of 2022, his weight was further reduced to ***168 lbs. (BMI 24.8) along with a 5.8% A1C value (beginning level of pre-diabetes),*** without having any medication interventions or insulin injections. During the period from 1/1/2022 to 8/20/2022, his average FPG is 93 mg/dL, PPG is 113 mg/dL, and daily glucose is 106 mg/dL. These good results are due to his non-traveling, low-stress, and regular daily life routines. Of course, the accumulated knowledge of chronic diseases, various complications, practical lifestyle management experiences, and development of many high-tech tools along with his medical research academic findings have contributed to his excellent health status since 1/19/2020, the beginning date of his self-quarantined life.

On 5/5/2018, he applied a continuous glucose monitoring (CGM) sensor device on his upper arm and checks his glucose measurements every 5 minutes for a total of ~288 times each day. He has maintained the same measurement pattern to the present day. In his research work, he uses his CGM sensor glucose at a time interval of 15 minutes (96 data per day). Incidentally, *the average sensor glucoses between 5-minute intervals and 15-minute intervals has* ***only a 0.6% difference (average glucose of 111.86 mg/dL for 5 minutes and average glucose of 111.18 mg/dL for 15 minutes*** *with a* ***correlation of 94%*** *between these two sensor glucose curves)* during the period from 2/19/20 to 7/22/22.

Therefore, over the past 13 years, he could study and analyze his collected 3+ million data regarding his health status, medical conditions, and lifestyle details. He applies his knowledge, models, and tools from mathematics, physics, engineering, and computer science to conduct his medical research work. ***His re-***

search work has a goal of achieving both "high precision" and "quantitative proof" in the medical findings for the ultimate objectives of "preventive medicine".

The following timetable provides a rough sketch of the emphasis in his medical research during each stage:

• 2000-2013: Self-study diabetes and food nutrition, developing a data collection and analysis software.
• 2014: Develop a mathematical model of metabolism, using engineering modeling and advanced mathematics.
• 2015: Weight & FPG prediction models, using neuroscience.
• 2016: PPG & HbA1C prediction models, using optical physics, artificial intelligence (AI), and neuroscience.
• 2017: Complications due to macro-vascular research, such as cardiovascular disease (CVD), coronary heart diseases (CHD), and stroke, using pattern analysis and segmentation analysis.
• 2018: Complications due to micro-vascular research such as kidney (CKD), bladder, foot, and eye issues (DR).
• 2019: CGM big data analysis, using wave theory, energy theory, frequency domain analysis, quantum mechanics, and AI.
• 2020: Cancer, dementia, longevity, geriatrics, DR, hypothyroidism, diabetic foot, diabetic fungal infection, and linkage between metabolism and immunity, learning about certain infectious diseases, such as COVID-19.
• 2021: Applications of linear elastic glucose theory (LEGT) and perturbation theory from quantum mechanics on medical research subjects, such as chronic diseases and their complications, cancer, and dementia.
• 2022: Applications of viscoelastic/viscoplastic glucose theory (LEGT) on 128 biomedical research cases and 5 economics research cases.

Again, to date, he has spent ~40,000 hours self-studying and researching medicine and he has read 3,000+ published medical papers online. He has collected and calculated more than three million pieces of data regarding his own medical conditions and lifestyle details. In addition, he has written and published 700+ medical research papers in 100+ various medicine, physics, mathematics, and engineering journals. Moreover, he has also given 120+ presentations at 70+ international medical conferences. He has continuously dedicated his time (11-12 hours per day and work each day of a year, without rest during the past 13 years) and efforts to his medical research work and shared his findings and learnings with other patients worldwide. In addition, he has also spent the past 12 years developing and maintaining a medicine and health software APP on his iPhone which functions as his private numerical laboratory to process the various experimental datasets of his medical conditions and lifestyle details.

Brief Introduction of Math-Physical Medicine (MPM) Research

The author has collected 3+ million pieces of data regarding his health condition and lifestyle details over the past 13 years. He spent the entire year of 2014 developing a metabolism index (MI) model using a topology concept, nonlinear algebra, algebraic geometry, and finite element method. This MI model contains various measured biomarkers and recorded lifestyle details along with their induced new biomedical variables for an additional ~1.5 million data. Detailed data of his body weight, glucose, blood pressure, heart rate, blood lipids, body temperature, and blood oxygen level, along with important lifestyle details, including diet, exercise, sleep, stress, water intake, and daily life routines are included in the MI database. In addition, these lifestyle details also include some lifetime bad habits and certain environmental exposures. Fortunately, the author has none of these lifetime bad habits and an extremely low degree of exposure to environmental factors. The developed MI model has a total of 10 categories covering approximately 500 detailed elements that constitute his defined "metabolism index model" which are the building blocks or root causes for diabetes and other chronic disease induced complications, including but not limited to CVD, CHD, stroke, CKD, DR, neuropathy, foot ulcer, hypothyroidism, dementia, and various cancers. The end result of the MI development work is a combined MI value within any selected period with 73.5% as its dividing line between a healthy and unhealthy state. The MI serves as the foundation for many of his follow-up medical research work.
During the period from 2015 to 2017, he focused his research on type 2 diabetes (T2D), especially glucose, including fasting plasma glucose (FPG), PPG, estimated average glucose (eAG), and hemoglobin A1C (HbA1C). During the following period from 2018 to 2022, he concentrated on researching medical complications resulting from diabetes, chronic diseases, and metabolic disorders which include heart problems, stroke, kidney problems, retinopathy, neuropathy, foot ulcer, diabetic skin fungal infection, hypothyroidism, diabetic constipation, dementia, and various cancers. He also developed a few mathematical risk models to calculate the probability percentages of developing various diabetic complications based on this MI model. From his previous medical research work with 700+ published papers, he has identified and learned that ***the associated energy of hyperglycemic conditions is the primary source of causing many diabetic complications which lead to death***. Therefore, a thorough knowledge of these energies is important for achieving a better understanding of the dangerous complications.

TD, SD, and FD Analysis Tools

This section has brief descriptions of TD correlation analysis with other observational results, SD VGT analysis with hysteresis loop area's energy results, and FD analysis with frequency curve area's energy results.

First of all, by using a TD analysis tool, we can examine the curves' moving trend and pattern visually along with their correlation numerically. We can also study the extremely high or low data values in the dataset. The visual observation or calculation-derived interpretations are a part of statistical analysis results which can indeed provide some useful hints or even derive some accurate conclusions. However, we must be aware of the limitations of the selected data size and time window and also be cautious of the appropriate statistics tool we choose.

Regarding the TD energy, we can apply the rudimentary definition of physics that ***"the wave carried energy is directly proportional to the square of wave's amplitude".*** However, the data quantity % of each wave category should be considered and included in order to obtain a more accurate TD energy value.

The author would like to describe the essence of his developed "hybrid model" that combines both the SD viscoelastic/plastic VGT analysis method and FD FFT analysis method with a comparison against the traditional TD statistical correlation analysis.

It is described in 10 steps in the English language instead of using mathematical equations to explain it. In this article, he has applied both the SD-VGT operations (steps 1-7) and the FD-FFT operations (steps 8-10). As a result, it is aimed at readers who do not have an extensive background in those academic subjects of engineering, physics & mathematics.

The first step is to collect the output data or symptom (strain or ε) on a time scale. The second step is to calculate ***the output change rate with time (dε/dt),*** i.e. the change rate of strain or symptom over each period. The third step is to gather the input data or cause ***(viscosity or η)*** on a time scale. The fourth step is to calculate the time-dependent input or cause ***(time-dependent stress or σ)*** by multiplying dε/dt and η together. The "time-dependent input or cause equation" of ***"stress σ = strain change rate of dε/dt * viscosity η"*** is the essential part of this "time dependency". The fifth step is to plot the input-output (i.e. stress-strain or cause-symptom) curve in a two dimensional space-domain or SD (x-axis versus y-axis) with strain (output or symptom) on the x-axis and stresses (time-dependent inputs, causes, or stresses) on the y-axis.

The sixth step is to calculate the total enclosed area within these stress-strain curves or input-output curves (i.e. the hysteresis loops), which is also an indicator of associated energies (either created energy or dissipated energy) of this input and output dataset. These energy values can also be considered as the degrees of influence on output by inputs. The seventh step is the assembly of the area values of the selected periods to compare the "historical progression and contribution of medical condition" over certain time periods.

For the frequency domain, the eighth step is to define a "hybrid input variable" by using ***"strain*stress"*** which yields another accurate estimation of energy ratio similar to the SD-VGT energy ratio associated with the hysteresis loop. The ninth step is to present these hybrid models' results of (strain*stress) in TD and then perform the FFT operation to convert them into FD. The enclosed area of the frequency curve (where the x-axis is the frequency and the y-axis is the amplitude of energy) can be used to estimate the total FD-FFT energy. The tenth step is to compare these FD energy results against the SD-VGT energy results, or even TD energy results.

After providing the above 10-step description, the author would still like to use the following set of VGT stress-strain mathematical equations in a two-dimensional SD to address the selected medical variables:

Strain
= ε (time-dependency characteristics of individual strain value at the present time duration)

Stress
= σ (based on the change rate of strain multiplying with a chosen viscosity factor η)
= η * (dε/dt)
= η * (d-strain/d-time)
= (viscosity factor η using individual viscosity factor at present time duration) * (strain at present quarter - strain at previous time duration)

Some of these inputs (causes or viscosity factors) are further normalized by dividing them or being divided by a normalization factor using certain established health standards or medical pieces of knowledge. Some examples of normalization factors are 6.0 for HbA1C, 120 mg/dL for glucose, 25 for body mass index (BMI), 4,000 steps after each meal, 10,000 or 12,000 steps for daily walking exercise depending on time-period selection, 13 grams to 20 grams of carbs/sugar intake amount per meal depends on time-period selection. If using the originally collected data, i.e. the non-normalized data would distort the numerical comparison of the hysteresis loop areas. Using this "normalization process", we can remove the dependency of the individual unit or certain unique characteristics associated with each viscosity factor. This process allows us to convert the originally collected variables into a set of ***"dimensionless variables"*** for easier numerical comparison and result interpretation.

The normalization factor for the "without meals number" is divided by the egg meal PPG by 120 mg/dL, while the normalization factor for the "with meals number" is divided by the egg meal PPG by (120*egg meal number percentages".

Results

Figure 1 shows one data table and the background information regarding total PPG, IF PPG, and Non-IF PPG.

9/17/22	Strain	Visc. 1	Visc. 2	/ 120	/ 120	Strain Rate	Strain	Stress 1	Stress 2	Height 1	Height 2	Area 1	Area 2	Time Zone	FD: 1	FD: 2
PPG	Total	IF	Non-IF	N. 1	N. 2	PPG Rate	Total	IF	Non-IF	IF	Non-IF	IF	Non-IF		IF	Non-IF
0 min	114	108	116	0.9	0.97	0	114	0	0	0	0	0	0		0	0
15 min	115	109	118	0.91	0.98	1.5	115	1.36	1.47	0.68	0.74	1.02	1.1		156.48	169.39
30 min	118	109	121	0.91	1.01	2.67	118	2.43	2.69	1.89	2.08	5.05	5.56	0-60 min	286.07	317.65
45 min	120	110	123	0.92	1.03	1.88	120	1.72	1.93	2.07	2.31	3.9	4.35	20.83	206.03	231.55
60 min	120	110	123	0.92	1.03	-0.09	120	-0.08	-0.09	0.82	0.92	-0.07	-0.08	29%	-9.89	-11.05
75 min	118	110	121	0.92	1.01	-1.84	118	-1.69	-1.85	-0.88	-0.97	1.63	1.79		-198.61	-218.13
90 min	116	109	118	0.91	0.98	-2.3	116	-2.1	-2.26	-1.89	-2.05	4.35	4.72	75-120 min	-242.4	-260.76
105 min	113	109	114	0.91	0.96	-2.85	113	-2.59	-2.71	-2.34	-2.48	6.67	7.08	43.33	-291.33	-305.3
120 min	110	108	110	0.9	0.92	-3.12	110	-2.8	-2.87	-2.69	-2.79	8.39	8.7	60%	-306.28	-314.2
135 min	109	108	110	0.9	0.91	-0.17	109	-0.15	-0.16	-1.47	-1.51	0.25	0.26		-16.8	-17.01
150 min	111	110	111	0.92	0.92	1.29	111	1.19	1.19	0.52	0.52	0.67	0.67	135-180 min	131.41	131.8
165 min	112	113	112	0.94	0.93	1.6	112	1.5	1.5	1.34	1.34	2.15	2.15	856%	168.63	167.9
180 min	113	114	113	0.95	0.94	0.99	113	0.94	0.93	1.22	1.21	1.21	1.2	12%	106.92	105.46
Avg	114	110	116	0.91	0.97	-0.03	114	-0.02	-0.02	-0.06	-0.05	35.2	37.5	72.7	-9.75	-2.70
TD: E#	25536	12049	13486								SD: E%	48%	52%	FD: E#	517679	586926
TD: E%	100%	47%	53%											FD: E%	47%	53%
Correlation	100%	7%	99%													

eclaireMD Data

Total Photos = 2020; Avg Glucose = 107.6
Avg Gram = 12.2; Avg Steps = 4088

	A	B
1		Libre glucose
2	Avg	114.42
3	First-Bite	113.71
4	15 min	115.21
5	30 min	117.88
6	45 min	119.76
7	60 min	119.67
8	75 min	117.83
9	90 min	115.53
10	105 min	112.68
11	120 min	109.56
12	135 min	109.39
13	150 min	110.68
14	165 min	112.28
15	180 min	113.27

eclaireMD Data

Total Photos = 542; Avg Glucose = 106.4
Avg Gram = 0.1; Avg Steps = 3445
Search keys: Water only+ Tea only

	A	B
1		Libre glucose
2	Avg	109.77
3	First-Bite	107.57
4	15 min	108.66
5	30 min	109.07
6	45 min	109.81
7	60 min	110.17
8	75 min	109.93
9	90 min	109.47
10	105 min	108.86
11	120 min	107.52
12	135 min	108.39
13	150 min	110.45
14	165 min	112.64
15	180 min	114.42

eclaireMD Data

Total Photos = 1478; Avg Glucose = 108.0
Avg Gram = 16.9; Avg Steps = 4323

	A	B
1		Libre glucose
2	Avg	116.13
3	First-Bite	115.96
4	15 min	117.62
5	30 min	121.11
6	45 min	123.41
7	60 min	123.15
8	75 min	120.73
9	90 min	117.76
10	105 min	114.08
11	120 min	110.30
12	135 min	109.75
13	150 min	110.77
14	165 min	112.15
15	180 min	112.85

Figure 1: Data table and background information

Figure 2 depicts the TD-squared PPG analysis result, SD-VGT analysis result, and FD-FFT analysis result.

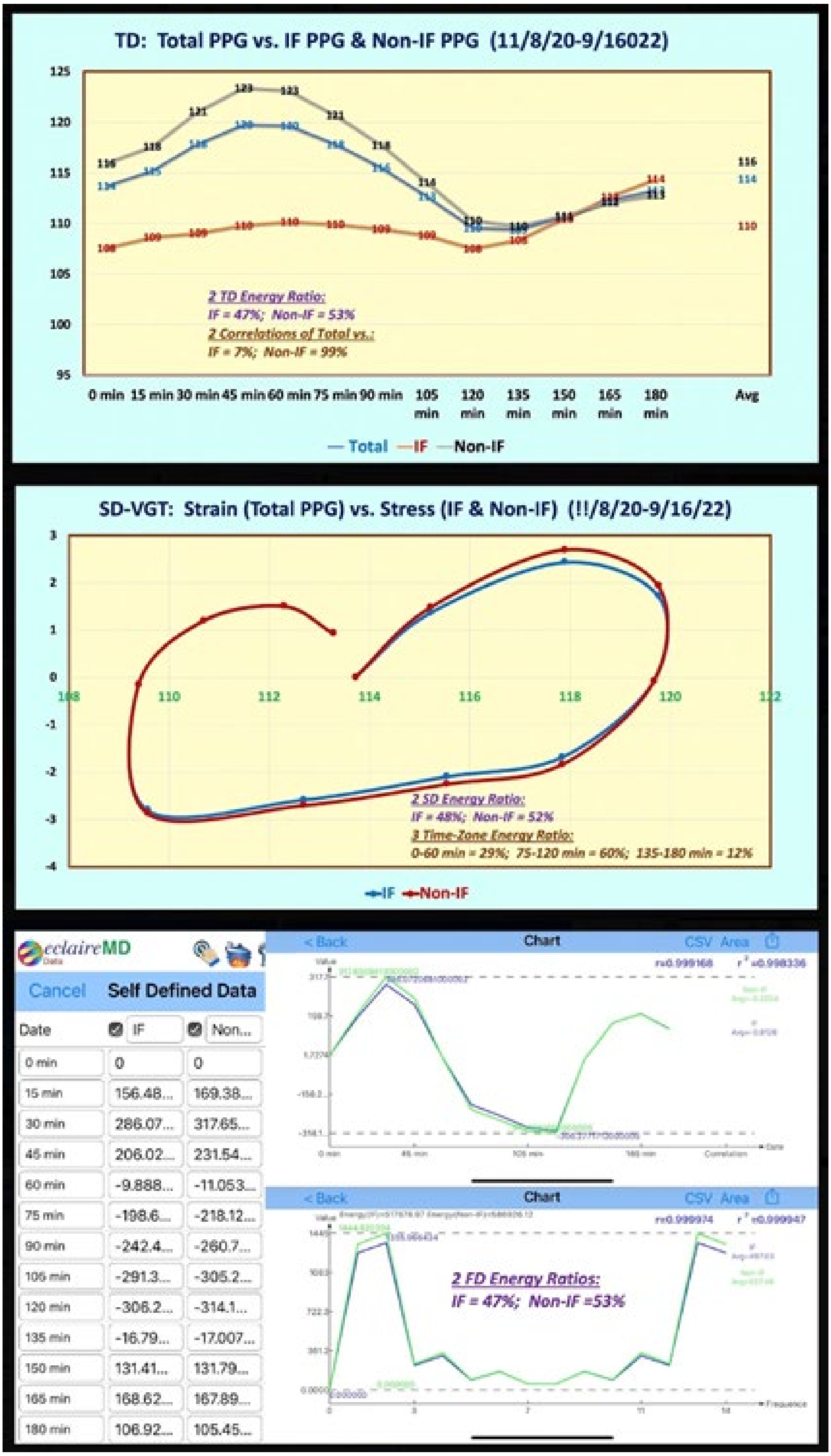

Figure 2: Time-domain, space-domain, and frequency-domain analysis results

Figure 3 illustrates comparison of energy ratios using TD, SD, FD, and ***the ratio of (Non IF PPG / IF PPG).***

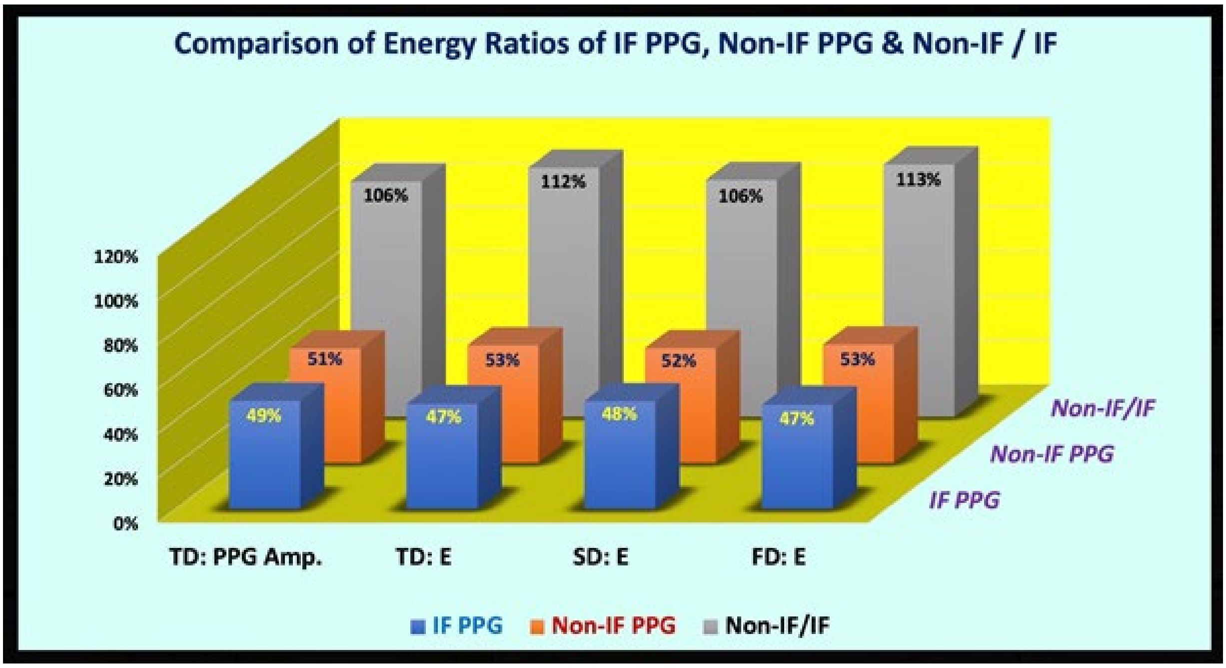

Figure 3: Comparison of energy ratios

Conclusions

In summary, there are 4 observations listed regarding ***the combined total PPG output versus 2 inputs of both IF PPG and Non-IF PPG.***

(1) Of the three PPG waveforms in TD, the 3-hour *total PPG waveform and Non-IF PPG show 2 similar mountain shape curves, while the 3-hour IF PPG waveform reflects a kind of "pseudo-flatline" shape or more of a "low rolling-hill" shape. The Non-IF meal PPG waveform has an average PPG of 116 mg/dL and peak PPG at 60-minutes of 123 mg/dL. On the other hand, the IF PPG waveform has an average PPG of 110 mg/dL and peak PPG at 60-minutes of 110 mg/dL and for the tail end of 114 mg/dL. In summary, between 1,478 Non-IF meals and 542 IF meals,* ***the difference in average PPG is 6 mg/dL and peak PPG is 13 mg/dL. More importantly, his squared PPG energy ratio is 47% for IF versus 56% for Non-IF, with a 6% TD energy difference. This is due to the average Non-IF PPG being higher than the average IF PPG.***

(2) Applying SD viscoelastic or viscoplastic glucose (SD-VGT) energy tool, both of his two hysteresis loops have presented a ***"viscoelastic" behavior.*** Furthermore, the energy ratio of two hysteresis loop areas is ***IF meals of 48% versus Non-IF meals of 52% with a 6% SD energy difference*** *due to the higher viscosity and higher stress of IF meals. In addition, the three time-period energy ratios are* ***0-min to 60-min at 29%, 60-min to 120-min at 60%, and 120-min to 180-min at 12%.*** *This shows that from the energy viewpoint, the maximum energy amount is associated with the second hour (75-120 minutes).*

*(3) Applying the FD-FFT energy tool and using a new variable of (strain*stress) from SD, his FD energy ratios of IF meals versus Non-IF meals are IF = 47% versus Non-IF = 53% with a 13% FD energy difference.*

(4) The above 1 average PPG amplitude and 3 energy ratio findings have a similar general pattern of energy ratios.

From the viewpoint of associated energy, ***the author can apply his learned knowledge from this article to better control his overall glucose situation from the IF method with food eating within a 10-hours window.***

References

For editing purposes, the majority of the references in this paper, which are self-references, have been removed for this article. Only references from other authors' published sources remain. The bibliography of the author's original self-references can be viewed at www.eclairemd.com.

Readers may use this article as long as the work is properly cited, their use is educational and not for profit, and the author's original work is not altered.

For reading more of the author's published VGT or FD analysis results on medical applications, please locate them through three published special editions from the following three specific journals:

(1) Series of Endocrinology, Diabetes and Metabolism (contact: Patrick Robinson)
(2) Journal of Applied Material Science & Engineering Research (contact: Catherine)
(3) Advances in Bioengineering and Biomedical Science Research (contact: Sony Hazi)