

# The GH-Method

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## Three Clinical Cases of T2D Control Using GH-Method: Math-Physical Medicine via both Lifestyle Management and Effective Medications (No. 059)

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**Keywords:** Type 2 diabetes; Lifestyle; Fasting plasma glucose; Postprandial plasma glucose

**Abbreviations:** T2D: type 2 diabetes; HbA1C: hemoglobin A1C; FPG: fasting plasma glucose; PPG: postprandial plasma glucose; MPM: math-physical medicine

### 1. INTRODUCTION

These three T2D clinical cases are:

- (A): 75 years old male in Taiwan
- (B): 47 years old female in Myanmar
- (C): 72 years old male in USA

### 2. METHODS

These 3 patients follow published findings, conclusions, and recommendations of the GH-method: math-physical medicine approach (see MPM-related references) and also utilized the developed AI glucometer tool to predict and control their T2D conditions.

### 3. RESULTS

Their major data facts and condition improvements are listed in Table 1:

Case A's health data during the recent period of 301 days (from 4/21/2018 to 2/15/2019) are listed as follows:

Weight (BMI): 138 / 126 lbs  
BMI: 21.6 / 19.7  
FPG: 140 / 109 mg/dL  
PPG: 180 / 119 mg/dL  
Daily glucose: 160 / 116 mg/dL  
A1C: 8.4% / 7.1 %  
R (FPG & weight): 52%  
R (PPG & carbs/sugar): 48%  
R (PPG & exercise): -53%  
FPG prediction accuracy: 94.9%

PPG prediction accuracy: 98.5%  
Glucose prediction accuracy: 98.7%

Case B's health data during the recent period of 154 days (from 9/11/2018 to 2/11/2019) are listed as follows:

Weight (BMI): 202 / 175 lbs  
BMI: 30.7 / 26.4  
FPG: 159 / 109 mg/dL  
PPG: 200 / 120 mg/dL  
Daily glucose: 164 / 117 mg/dL  
A1C: 8.9% / 6.0%  
R (FPG & weight): 89%  
R (PPG & carbs/sugar): 46%  
R (PPG & exercise): -53%  
FPG prediction accuracy: 98.2%  
PPG prediction accuracy: 99.5%  
Glucose prediction accuracy: 95.7%

Case C's health data during a long period of 1,296 days (from 6/1/2015 to 12/31/2018) are listed as follows:

Weight (BMI): 210 / 167 lbs  
BMI: 31.1 / 24.7  
FPG: 185 / 114 mg/dL  
PPG: 380 / 117 mg/dL  
Daily glucose: 279 / 116 mg/dL  
A1C: 10.0% / 6.5%  
R (FPG & weight): 83%  
R (PPG & carbs/sugar): 48%  
R (PPG & exercise): -66%  
FPG prediction accuracy: 99.87%  
PPG prediction accuracy: 99.97%  
Glucose prediction accuracy: 99.95%

	Begin Date	End Date	Delta		Begin Date	End Date	Delta		Begin Date	End Date	Delta
Case A (Taiwan)	4/21/18	2/15/19	301	Case B (Myanmar)	9/11/18	2/11/19	154	Case C (USA)	6/15/15	12/31/18	1296
Weight (lbs)	138	126	12	Weight (lbs)	202	175	27	Weight (lbs)	210	167	43
BMI (kg/m <sup>2</sup> )	21.4	19.7	1.9	BMI (kg/m <sup>2</sup> )	30.7	26.4	4.3	BMI (kg/m <sup>2</sup> )	31.1	24.7	6.4
FPG (mg/dL)	140	109	31	FPG (mg/dL)	159	109	50	FPG (mg/dL)	185	114	71
PPG (mg/dL)	180	119	61	PPG (mg/dL)	200	120	80	PPG (mg/dL)	380	117	263
Daily Glucose (mg/dL)	160	116	44	Daily Glucose (mg/dL)	164	117	47	Daily Glucose (mg/dL)	279	116	163
A1C (%)	8.4	7.1	1.3	A1C (%)	8.9	6.0	2.9	A1C (%)	10.0	6.5	3.5
R % (FPG & Weight)		52		R % (FPG & Weight)		89		R % (FPG & Weight)		83	
R % (PPG & Carbs/sugar)		48		R % (PPG & Carbs/sugar)		46		R % (PPG & Carbs/sugar)		48	
R % (PPG & Exercise)		53		R % (PPG & Exercise)		53		R % (PPG & Exercise)		66	
PPG Prediction Accuracy %		94.9		PPG Prediction Accuracy %		98.2		PPG Prediction Accuracy %		99.87	
FPG Prediction Accuracy %		98.5		FPG Prediction Accuracy %		99.5		FPG Prediction Accuracy %		99.97	
Glucose Prediction Accuracy %		98.7		Glucose Prediction Accuracy %		95.7		Glucose Prediction Accuracy %		99.95	

**Table 1:** 3 clinical cases of weight, glucose, and key statistical factors.

The summary findings are:

(1) Three patients have different time period and achieved different degree of success, Case C is the best, Case B is next, and Case A needs to work harder. Most importantly, their HbA1C have dropped from 8-10 range down to 6-7 range.

(2) Three types of correlations (R) are high which proves close relationships existed among FPG & Weight, PPG & Carbs/sugar and Exercise.

(3) Both B and C were obese at the beginning. It took C about 4 years to loose 50 lbs becoming normal weight. It took B only 5 months to loose 27 lbs becoming slight overweight with the help of medication. Case A has no weight problem due to his light normal weight.

(4) As a direct result of weight reduction, all of 3 cases show their FPG drop with high correlation between weight and FPG.

(5) PPG has dropped by 80 mg/dL, and it has a 46% correlation with her carbs/sugar intake (15 gram, low-carbs diet) and -53% correlation with post-meal walking (2,179 steps & ~20 minutes).

(6) The accuracy of predicted glucose (120.21 mg/dL) vs measured glucose (125.65 mg/dL) is very high, 96%. But their correlation is only 61% due to some missing or incorrect data input around November of 2018.

(7) This patient utilized the author-developed AI glucometer which has learned sufficient local food information to be able to predict PPG very accurately (96%). As a comparison, the author's PPG prediction model has 99.3% accuracy and 82% correlation based on his collected 3,992 meals data (53% US and 47% international).

#### 4. CONCLUSION

Using GH-method: math-physical medicine, AI tool, and her physician's careful and effective medication treatments, this T2D patient's has achieved significant improvement on her diabetes conditions control within 5 months.