Mini Review

The impact of plantar fasciitis on glucose and A1C (GH-method: math-physical medicine)

Introduction

The author is investigating the impact of plantar fasciitis on postprandial plasma glucose (PPG) and HbA1C based on 522 data collected for a period of 174 days from 10/28/2018 to 4/27/2019 with post-meal walking steps, carbs/sugar intake grams, and measured PPG. The dataset is provided by the author, who uses his own type 2 diabetes (T2D) 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

In 2018, this patient walked 18,458 steps daily (~7.7 miles or ~12.3 km), where each heel took 9,229 impact force per day. During the second half of 2018 while he was traveling, he wore a pair of leisure shoes instead of his customized shoes with protective insoles. Towards the end of 2018, his plantar fasciitis condition returned. As a result, he could not walk as much as usual due to the sharp pain in his heels. By March of 2019, he noticed his increased values of PPG and

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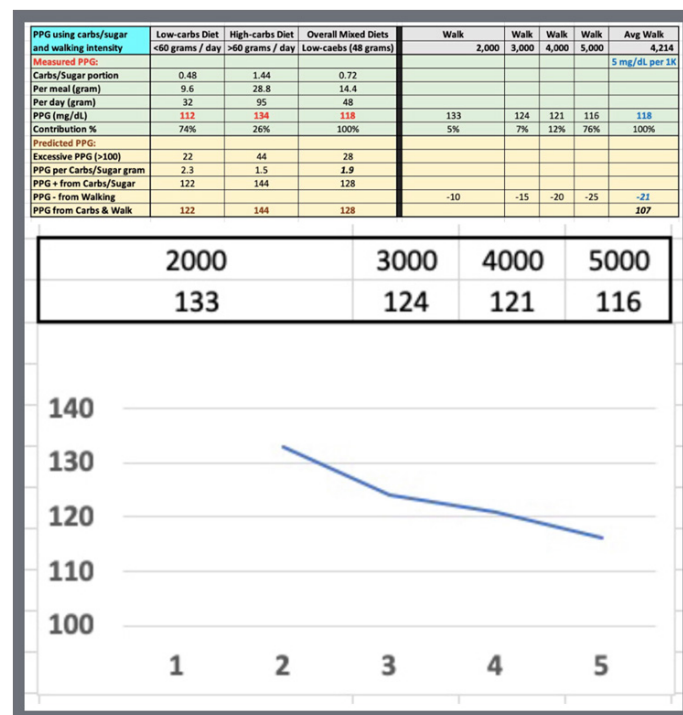**Correspondence:** Gerald C Hsu, Medical Research Scientist, eclaireMD Foundation, USA, Email g.hsu@eclairemd.com

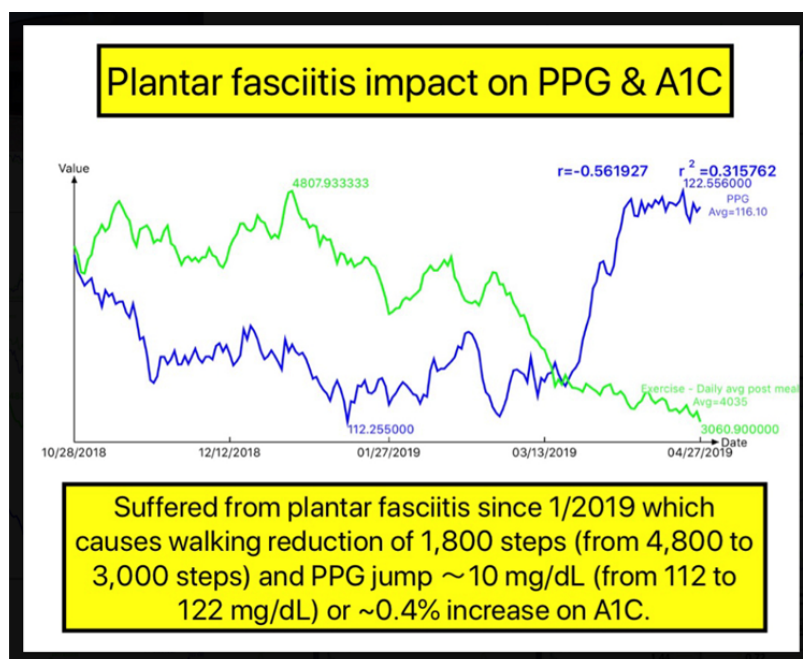Received: May 02, 2020 | Published: May 18, 2020

HbA1C. The author then utilized his MPM approach and his previous published papers to analyze his personalized data.

Results

During the plantar fasciitis period, his post-meal waking steps reduced by 1,800 steps from 4,800 to 3,000. Based on the author's exercise formula (Figures 1) (Figure 2), every block of one thousand steps decreased approximately 5 mg/dL of PPG. The 1,800 steps reduction would increase PPG value by 9 mg/dL. This estimation is quite comparable with the actual increase amount of PPG of 10 mg/dL from 112 to 122. The minor difference of 1 mg/dL is resulted from a variance of carbs/sugar intake amount.[1–5]

PPG using carbs/sugar and walking intensity	Low-carbs Diet <60 grams / day	High-carbs Diet >60 grams / day	Overall Mixed Diets Low-caebs (48 grams)	Walk	Walk	Walk	Walk	Avg Walk
				2,000	3,000	4,000	5,000	4,214
Measured PPG:								5 mg/dL per 1K
Carbs/Sugar portion	0.48	1.44	0.72					
Per meal (gram)	9.6	28.8	14.4					
Per day (gram)	32	95	48					
PPG (mg/dL)	112	134	118	133	124	121	116	118
Contribution %	74%	26%	100%	5%	7%	12%	76%	100%
Predicted PPG:								
Excessive PPG (>100)	22	44	28					
PPG per Carbs/Sugar gram	2.3	1.5	1.9					
PPG + from Carbs/Sugar	122	144	128					
PPG - from Walking				-10	-15	-20	-25	-21
PPG from Carbs & Walk	122	144	128					107

	2000		3000	4000	5000
	133		124	121	116

Figure 1 Formulas for PPG vs. diet/exercise.

Figure 2 Plantar fasciitis impact on PPG and A1C.

Conclusion

This special clinical case demonstrates the inter-connectivity among different parts of the human body. Even having plantar fasciitis could increase a patient's glucose and A1C significantly. It also shows the importance of lifestyle management, including both diet and exercise, to diabetes patients. Finally, the MPM approach can be used to analyze many biomedical phenomena as long as the "related and clean" data are collected and organized efficiently.

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Conflicts of interest

The authors declare have no conflict of interest about the publication of this paper.

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