

TREATING OUR FAMILY AND YOURS

AMERICAN OSTEOPATHIC ASSOCIATION

Introduction

- Type 2 diabetes and obesity is at an all time high.¹
- Lifestyle management through healthy nutrition and physical activity is a critical part of managing Type 2 diabetes.²
- One lifestyle modification to tackle Type 2 diabetes is Intermittent Fasting or Time Restricted Feeding.
 - Restrict caloric consumption to specified hours of the day or days of the week.
- Time Restricted Feeding has been found to have beneficial effects on glycemic control and insulin sensitivity in patients with pre-diabetes at risk for Type 2 Diabetes ^{3,4}
- Aim to assess safety and efficacy of Time Restricted Feeding for individuals with Type 2.

Methods

- Participants were recruited using convenience sampling for this randomized crossover study through <u>inclusion/exclusion criteria</u> (click to view specific parameters)
- Participants were provided continuous glucose monitors (CGM) and randomized using coin flip to Fasting vs Non-Fasting arm
 - Fasting arm: Eat unrestricted calories for 8 hours (12pm-8pm) and fast for 16 hours (8pm-12pm) for 14 days
 - Non-Fasting: Eat unrestricted diet as normal for 14 days (calorie count to maintain weight provided)
- Participants were asked to log meals to monitor calorie count and take ketone readings every day
- Weight, Calorie Count, and Ketone levels were analyzed before and after each study arm using T-tests and CGM data was extracted.

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TAP TO GO BACK **TO KIOSK MENU**

Age–Adjusted Prevalence of Obesity and Diagnosed Diabetes Among US Adults



Click to zoom in on image

Study Participant Demographics

er of pants	Sex	Mean Age (years)	Mean (
	All Female	52.6 ± 14.8	207.5





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Safety and Efficacy of Time Restricted Feeding in Patients with Type 2 Diabetes Jonathan Junqua OMS; Elijah Lustig OMS, Jay H. Shubrook DO, Kim Pfotenhauer DO Touro University California Deviation **P-value*** .038 .8 0.2 0.458)27 0.045

Weight loss (Pre vs Post-**Fasting in lbs**)

Diet (calories consumed fasting vs non-fasting)

Ketones (Fasting vs Nonfasting)

signifies statistical significance *P-values calculated using T-tests;

Rea	sults
Difference in Average	Standard]
3.04 lbs (207 lbs vs 203.96 lbs)	±2.
-73.5 calories (1467.4 vs 1540.9)	±20
0.038 (0.171 vs 0.134)	±0.0





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Safe with Room for Increasing Fasting Intervals

CGM Results: Two Types of Participants

Potential to be Unsafe without Close Monitoring





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Improved Glucose Variability but Increased Probability for Hypoglycemia











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Conclusion

- Time Restricted Feeding with 16 hour fasting intervals was effective for weight-loss and decreasing glucose variability.
- Caloric Intake was not significantly different for participants between the fasting and non-fasting portion.
 - Decreased Glucose Variability between study arms is attributable to the Fasting Schedule
- Ketones levels were elevated while fasting versus non-fasting with no risk of Diabetic Ketoacidosis.
- CGM data shows that the Time Restricted Feeding schedule had varied levels of safety for participants based on their starting glucose levels
 - Fasting was safe for participants with very high blood glucose levels with potential for increasing the number of hours fasting.
 - Fasting should be approached with caution for participants whose blood glucose levels are more controlled due to the risk of hypoglycemic episodes.
- Average rates of hypoglycemia were not higher while fasting vs nonfasting.
- Completion rate of 100% speaks to the feasibility of Intermittent Fasting and Time Restricted Feeding.



References

1. CDC's Division of Diabetes Translation. (2017, April). Maps of Diagnosed Diabetes and Obesity in 1994, 2000, and 2015. Retrieved from https://www.cdc.gov/diabetes/statistics/slides/maps_diabetesobesity94.pdf

2. American Diabetes Association. (2019). *Standards of Medical Care in* Diabetes—2019 Abridged for Primary Care Providers. Clinical Diabetes, 37(1), 11-34. https://doi.org/10.2337/cd18-0105

3. Hutchison, A. T., Regmi, P., Manoogian, E. N. C., Fleischer, J. G., Wittert, G. A., Panda, S., & Heilbronn, L. K. (2019). Time-Restricted Feeding Improves Glucose Tolerance in Men at Risk for Type 2 Diabetes: A Randomized Crossover Trial. Obesity. https://doi.org/10.1002/oby.22449

4. Sutton, E. F., Beyl, R., Early, K. S., Cefalu, W. T., Ravussin, E., & Peterson, C. M. (2018). Early Time-Restricted Feeding Improves Insulin Sensitivity, Blood Pressure, and Oxidative Stress Even without Weight Loss in Men with Prediabetes. *Cell Metabolism*, 27(6), 1212-1221.e3. https://doi.org/10.1016/j.cmet.2018.04.010







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Safety and Efficacy of Time Restricted Feeding in Patients with Type 2 Diabetes



Obesity (BMI ≥30 kg/m²)



<u>Diabetes</u>







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Age–Adjusted Prevalence of Obesity and Diagnosed Diabetes Among US Adults

CDC's Division of Diabetes Translation. United States Diabetes Surveillance System available at http://www.cdc.gov/diabetes/data













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Inclusion Criteria

- Has a smartphone or computer access to log foods daily Willing to fast for 16 hours per day for at least 10 days out of 14 days while in the study arm Willing to receive 2 venipunctures at each of 2 visits (4 times total)

Exclusion Criteria

- Has an already unacceptable risk of hypoglycemia (as determined by the clinical team)
- Had any severe hypoglycemia (<50 mg/dL glucose and needing assistance from others to revive) in the past 6 months
- Has hypoglycemic unawareness

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- Over the age of 18
- Diagnosed with type 2 diabetes for at least 1 year
- A1c between 6.5-9.0%
 - English speaking
 - Has a cell phone or landline to be able to contact the study team for any questions or concerns
 - Willing to wear a continuous glucose monitor for 4 weeks Willing to log all food for 4 weeks.

- Is currently pregnant
- Uses short-acting/mealtime insulin injections or sulfonylureas









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