

SUPPLEMENTAL MATERIAL

Data S1.

Supplemental Methods

Supporting analyses of VAT

The primary analysis for HAT included all participants with complete scans at baseline and follow-up. Two supporting analyses were also performed. For the first supporting analysis, all participants with an MRI scan at both baseline and follow-up were included, whether or not the scans were complete. Complete scans included 51 ‘slices’ (see Figure S1) but in some cases motion or other artifacts allowed only a smaller number of scans to be included. The scans were then analyzed with the same model used for the primary analysis. The second supporting analysis included all scans, whether or not they were complete and whether or not they were part of a baseline-follow-up pair. For this model, scans were considered repeated measures within participants and a mixed model with both fixed and random effects was fit. Using model results, least squares estimates of linear contrasts of model parameters were computed for the mean changes in the Supplemented Avocado and Diet and Habitual Diet Groups and the difference of the changes.

All three models produced qualitatively similar results; that is, a small non-significantly larger increase in VAT in the Supplemented Avocado Diet Group. All are consistent with the conclusion that there was no improvement in VAT in the Supplemented Avocado Diet Group Compared to the Habitual Diet Group.

Changes in VAT

Primary and supporting models	n	Supplemented Avocado Diet Group	Habitual Diet Group	Estimate	95% CI	p-value
1. Primary analysis						
All participants with complete follow-up MRI scans	923	0.074	0.057	0.017	-0.024, 0.058	0.405
2. All available pairs						
All participants with follow-up scans, including incomplete scans	935	0.072	0.057	0.015	-0.026, 0.055	0.39
3. All available scans						
All baseline and follow-up scans, complete and incomplete	1008	0.077	0.063	0.014	-0.026, 0.054	0.54

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Table S1. Inclusion and exclusion criteria.

Inclusion Criteria

- Increased waist circumference defined as ≥ 35 inches for women, ≥ 40 inches for men (NCEP ATP III 2005)
- At least 25 years old at screening
- Not currently eating more than 2 avocados per month (habitual intake in U.S.)

Exclusion Criteria

- Does not eat avocados
- Sensitive / allergic to avocados
- Allergies to latex or oral allergy syndrome
- Not willing or unable to undergo MRI scans
- Unstable medical condition such as on dialysis for renal disease, cardiac, gastrointestinal, or hepatic disease, cancer (non-melanoma skin cancer >5 years ago acceptable, any cancer site >10 yrs without recurrence).
- Pregnant, lactating, intention of pregnancy
- Lost or gained 10 lbs of body weight in last year
- Following restricted or weight loss dietary patterns
- Unstable anti-anxiety / anti-depressive / anti-psychotic medication use defined as dose change within last 6 months
- Oral steroid use within the last 6 months longer than 7 days
- Elevated alcohol intake (7+ drinks/week women; 14+ drinks/week men)
- Participation in another clinical intervention trial within 30 days of baseline
- PI judgment

From: The design and rationale of a multi-center randomized clinical trial comparing one avocado per day to usual diet: The Habitual Diet and Avocado Trial (HAT) [15].

Table S2. Diet Composition at baseline and during the intervention derived from 24 hour recall at each visit*

Variables	Avocado Supplemented Diet Group				Habitual Diet Group				Estimated Mean difference**	p-value
	Baseline				Intervention					
	8 wk	16 wk	26 wk	8 wk	16 wk	26 wk				
N	504	490	479	472	503	486	487	480		
Energy, kcal	1889	2046	2053	2029	1839	1874	1873	1880	117	0.009
Protein, g	78	77	79	77	82	82	82	79	0.5	0.846
Animal protein, g	51	49	51	49	56	56	56	53	-0.1	0.979
Vegetable protein, g	27	29	28	28	26	26	26	26	0.6	0.523
Protein, %E	17	15	16	16	18	18	18	18	-1.4	0.001
Carbohydrates, g	213	212	211	211	202	205	207	205	-4.6	0.406
Carbohydrates, %E	44	40	39	40	43	43	42	43	-4.1	<0.001
Fiber, g/d	20	29	29	28	20	19	19	19	9.4	<0.001
Fiber, g/1000 kcal	11	15	15	15	11	11	11	11	4	<0.001
Fat, g	81	101	100	99	80	81	80	82	18	<0.001
Fat, %E	37	43	43	43	38	38	37	38	6.0	<0.001
SFA, g	27	29	29	28	26	27	26	27	1.3	0.207
SFA, %E	12	12	12	12	12	12	12	13	0.0	0.945
MUFA, g	29	42	42	42	28	29	28	30	13.0	<0.001
MUFA, %E	13	18	18	18	13	13	13	13	5.2	<0.001
PUFA, g	19	21	20	20	18	18	18	18	1.4	0.067
PUFA, %E	9	9	8	9	9	8	8	8	0.0	0.988
Omega-3 FA, g	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.1	0.12	0.286
Omega-6 FA, g	17	18	18	18	16	16	16	16	1.2	0.074
Cholesterol, mg/d	285	285	309	303	313	314	321	321	7.9	0.582
Cholesterol, g/1000 kcal	154	143	153	152	177	174	182	177	-5.3	0.473
Alcohol, %E	2	1.7	2.1	2	1.6	1.6	2	2.3	-0.4	0.128
HEI	53	62	62	62	54	54	54	55	8.4	<0.001

* Recalls were collected via phone call within +/- 2-weeks of the intervention visit timepoints

** Estimated mean change from baseline averaged over follow-up. Visit specific values are estimates from a mixed effects model. See Methods.

SFA, saturated fatty acid; MUFA, monounsaturated fatty acid; PUFA, polyunsaturated fatty acid; FA, fatty acid; HEI, healthy eating index.

Table S3. Descriptive Statistics of MRI Measures (mean +/- SD)

Variable	Supplemented Avocado Diet Group (n=505)		Habitual Diet Group (n=503)	
	Baseline	End of Study visit	Baseline	End of Study visit
VAT ¹	3.2 ± 1.4	3.3 ± 1.3	3.2 ± 1.4	3.3 ± 1.4
HFF ²	9.5 ± 9.9	10.2 ± 10.6	10.2 ± 11.2	10.5 ± 11.0

VAT = visceral adipose tissue volume (in liters); HFF = hepatic fat fraction.

Table S4. Visceral adipose tissue (VAT) measures by subgroup.

Subgroups	n	Supplemented Avocado Diet Group	Habitual Diet Group	Estimate	95% CI	p-value
VAT (L) – all participants	923	0.074	0.057	0.017	-0.024, 0.058	0.405
Sex						0.808
Women	679	0.077	0.056	0.020	-0.027, 0.068	
Men	244	0.067	0.058	0.009	-0.071, 0.089	
Non-Hispanic White						0.273
Yes	512	0.072	0.077	-0.005	-0.060, 0.050	
No	411	0.073	0.031	0.041	-0.020, 0.103	
VAT (L)						0.126
Low [\leq 3L]	462	0.107	0.058	0.050	-0.008, 0.108	
High [$>$ 3L]	461	0.041	0.055	-0.014	-0.072, 0.044	
Kcal intake						0.425
Low [\leq 1749]	460	0.088	0.070	0.018	-0.040, 0.076	
High [$>$ 1749]	463	0.061	0.042	0.019	-0.038, 0.077	
HEI (0-100)						0.889
Low [\leq 52.7]	450	0.064	0.044	0.019	-0.040, 0.078	
High [$>$ 52.7]	473	0.083	0.069	0.025	-0.033, 0.082	

VAT, visceral adipose tissue volume (in liters); Kcal, kilocalories; HEI, Healthy Eating Index (range from 0-100).

Table S5. Effect of COVID-19 shutdown on follow-up MRIs.

Follow-up MRI scan	BEFORE shutdown	DURING shutdown	Total
Not done	38	34	72
Done	754	182	936
Within window	749	120	869
> 7 months	5	62	67
Total Participants	792	216	1008

From: The design and rationale of a multi-center randomized clinical trial comparing one avocado per day to usual diet: The Habitual Diet and Avocado Trial (HAT) [15].

Figure S1. Representative example of MRI image for VAT.

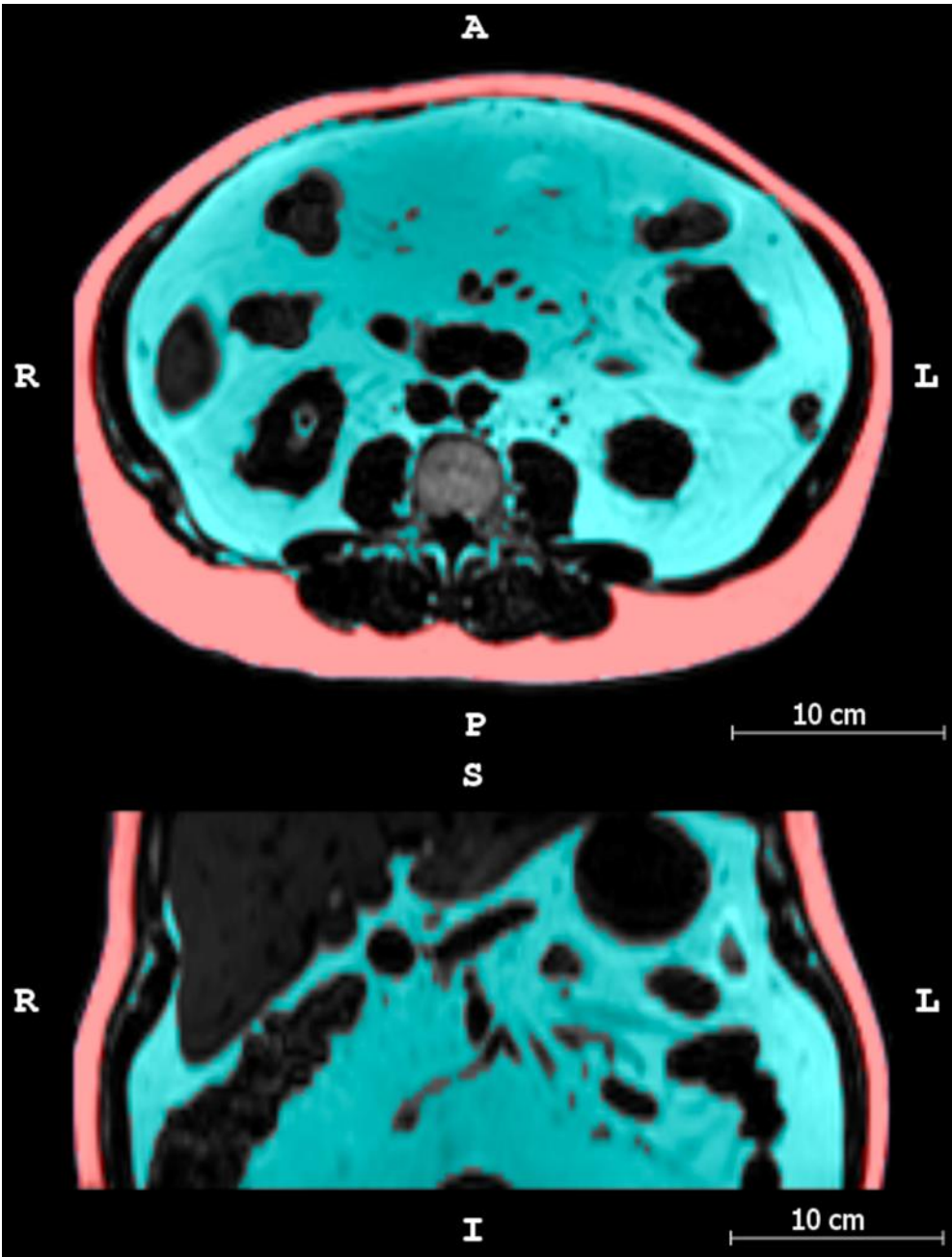
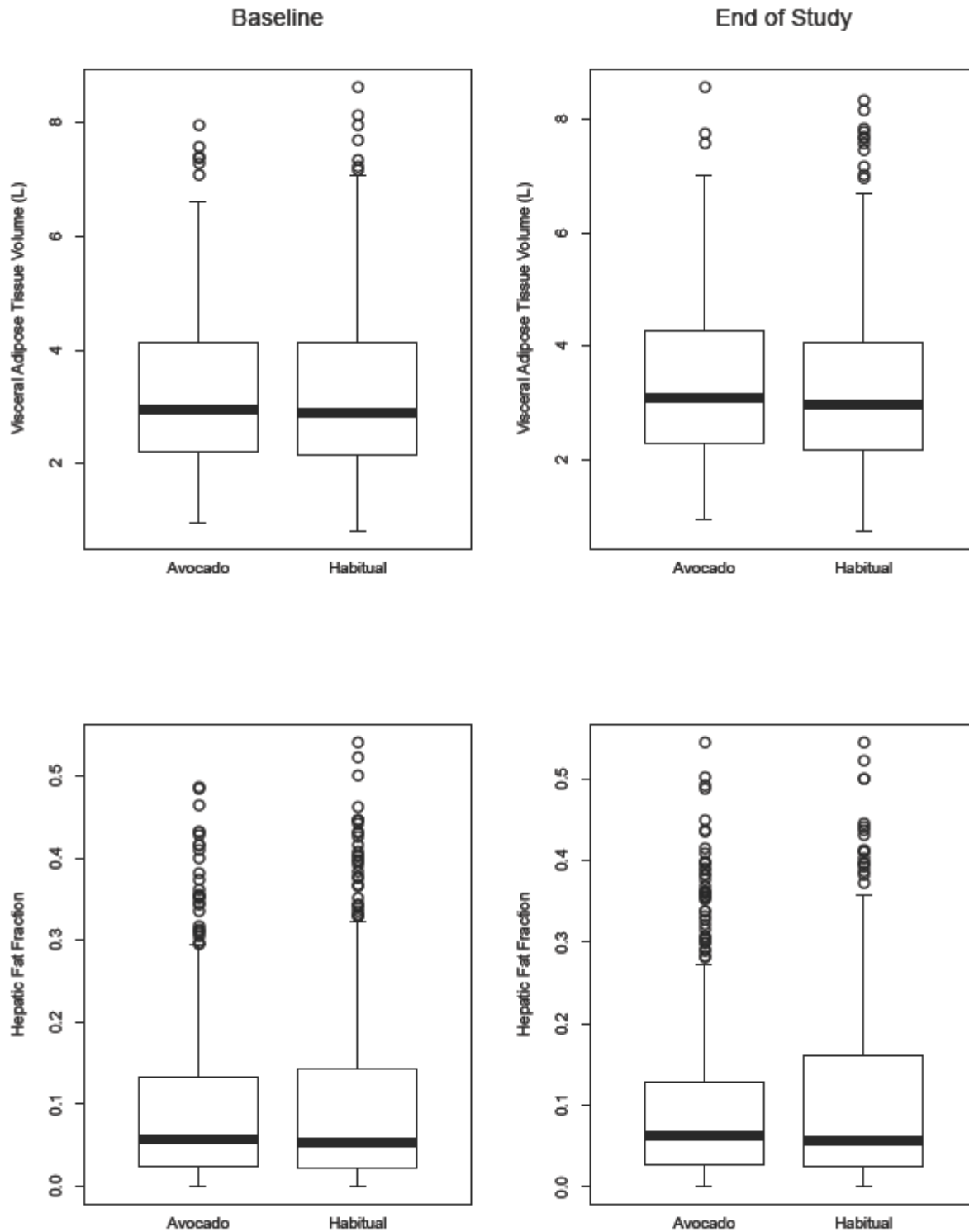


Figure S2. Boxplots for the VAT and HFF data at baseline and end of study, by arm.



Note: Data are presented as box plots. The box stretches from the 25th to the 75th percentile. The median is shown with a line across the box. The whiskers indicate 1.5 times the interquartile range above the third and below the first quartiles, or the upper or lower extreme values, whichever is closer. Open circles indicate observations outside the range of the upper whisker.