

## SUPPLEMENTARY DATA

### **Inclusion Criteria**

- $\geq 60$  years
- sedentary (no progressive resistance training; structured exercise  $\leq 1$ /week; less than 150 min/week low or moderate intensity walking or other unstructured exercise)
- type 2 diabetes and metabolic syndrome. Participants could be treated with diet alone, oral medications, insulin or combination at the time of enrolment, without recent changes in medication ( $<3$  months).

### **Exclusion Criteria**

- unstable chronic diseases, contraindications to PRT
- un-willing to commit to a 12-month exercise training program, 3 times per week

### **Bioelectrical Impedance Assessment (BIA)**

All participants were fasting and BIA was performed at a similar time of day for all participants. BIA was not available in 3 participants due to presence of a pacemaker.

Skeletal muscle mass was determined using the following equation [1]:

$$\text{Skeletal muscle mass} = [0.401 \times (\text{height}^2/\text{BIA} + (3.825 \times \text{sex}) + (0.071 \times \text{age}))] + 5.102$$

with height in cm, BIA resistance in ohms (average of 3 measures), sex coded 1 for men and 0 for women, and age in years.

Total fat mass was determined by using BIA, by subtracting lean body mass from total mass to determine total fat mass. Lean body mass was determined using the following equation [2]:

$$\text{Lean Body Mass} = -4.03 + 0.734(\text{Ht}^2/\text{BIA}) + 0.116(\text{BW}) + 0.096(\text{X}_c) + 0.984(\text{sex})$$

with height (Ht) in cm, BIA resistance in ohms (average of 3 measures), body weight (BW) in kg,  $X_c$  reactance in ohms and sex coded 1 for men and 0 for women

For CT scans of the abdomen, a 1-mm thick slice was taken at the mid-point between the iliac crest and lowest rib (determined with the participant supine). This scan location is concordant with the waist circumference measurement site used by the International Diabetes Federation (IDF), and is a criteria used by the IDF to classify metabolic syndrome [3]. Settings were kV: 100 and mA: 170 with a displayed field of view (DFOV) 45 – 48, depending on participant size.

### **Computed Tomography (CT)**

For CT scans of the mid-thigh, a 1-mm slice was performed at the mid-point between the inguinal crease and the proximal pole of the patella measured with the participant supine and knee flexed. The non-dominant leg was used. Settings were kV: 100 and mA: 170 with a (DFOV) 25.

Scan images were analysed according to optical density by a blinded investigator using NIH Image software (Version 1.63, National Institutes of Health) programmed with specific macros to quantify cross-sectional adipose tissue. To determine VAT, macros were programmed to select the outer perimeter extending from the paraspinal muscles to the anterior abdominal muscles. The program calculated this measure by summing the area within the selected perimeter occupied by pixels with optical density in the range of 140 to 240. Mid-thigh muscle density (unitless measure) was calculated according to a specific optical density range (10-113) chosen to best discriminate muscle from fat and bone. Co-efficient of repeatability, determined

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using a Bland-Altman plot on a subset of 10 scans was found to be excellent at 0.49 for VAT, 0.44 for CSA, and 1.52 for SCAT [4].

**Supplementary Table 1.** Baseline participant characteristics.

Variable	Total n=100	PRT n=47	SHAM n=53	p-value
<b>Demographics</b>				
Age (years)	68.1±5.5	67.1±4.8	68.9±6.0	0.09
Men, Women (n)	50, 50	24, 23	26, 27	0.84
<b>Health Status</b>				
Duration of diabetes (years)	8±6	7±5	9±7	0.07
Number of chronic diseases (n)	5±2	5±2	5±2	0.93
Total number of medications (n)	6±3	5±3	6±3	0.21
Insulin users (n)	16	7	9	0.78
Metformin users (n)	73	35	38	0.62
Metformin dosage (mg/day)	1552±661	1148±864	1120±925	0.88
Insulin (mU/L)*	9 (34)	8.0 (13.2)	9.6 (34)	0.20
HOMA2-IR*	2.88±1.13	2.69±0.95	3.06±1.25	0.14
HbA1c (%)	7.11±1.14	6.89±0.94	7.30±1.26	0.07
HbA1c (mmol/mol)	54±12.5	52±10.3	56±13.8	0.07
<b>Measures of body composition</b>				
Body weight (kg)	89.0±17.3	89.5±15.3	88.6±18.9	0.78
BMI (kg/m <sup>2</sup> )	31.5±5.4	31.3±4.6	31.6±6.1	0.79
Skeletal muscle mass (kg)	30.4±4.1	30.7±4.3	30±3.9	0.4
Total fat mass (kg)	31.8±11.6	31.8±10.0	31.8±12.9	0.99
VAT (cm <sup>2</sup> )	212.6±88.0	220.7±84	205.2±91.7	0.38
Mid-thigh CSA (cm <sup>2</sup> )	109.0±24.1	110.4±26.3	107.6±22.1	0.57
Mid-thigh muscle attenuation (unitless)	84.2±2.3	84.2±2.2	84.1±2.4	0.79

Normally distributed data presented as mean±SD. Non-normally distributed data presented as median (range). Difference between groups was assessed via one-way ANOVA. Non-normally distributed data were log-transformed before use with parametric statistics.

\*16 participants were omitted due to insulin therapy.

HOMA2-IR: Homeostatic Model of Assessment 2

HbA1c: Glycosylated hemoglobin

BMI: Body Mass Index

CSA: Cross Sectional Area

VAT: Visceral Adipose Tissue area

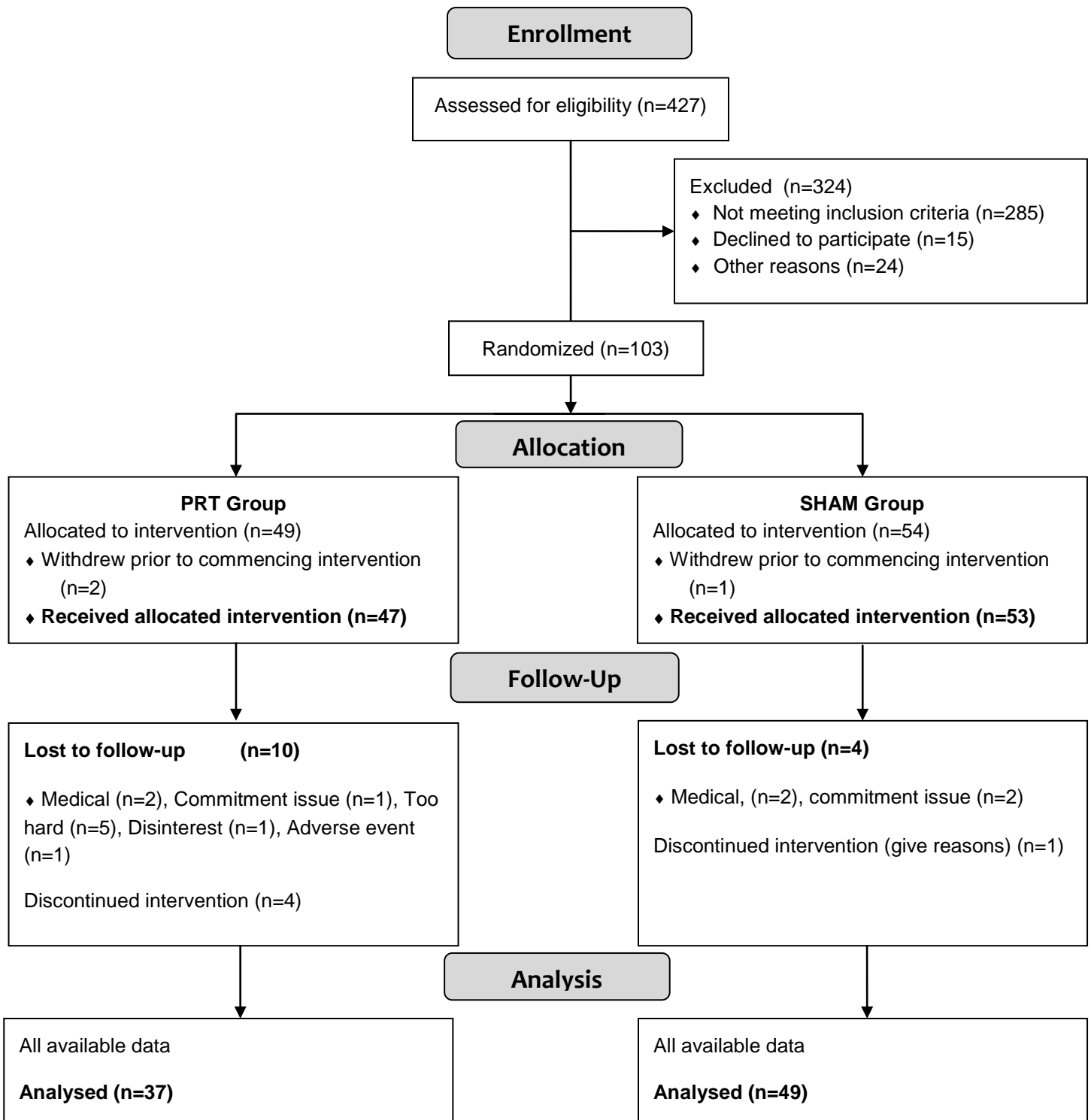
Mid-thigh muscle attenuation is a measure of intramyocellular lipid accumulation. Higher mid-thigh muscle attenuation index (unitless measure based on optical density gradient from image analysis of CT scans) indicates greater intramyocellular lipid.

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**Supplementary Table 2.** Changes in body composition and changes in HOMA2-IR and changes in HbA1c.

	Changes in HOMA2-IR vs. Changes in Body Composition						Changes in HbA1c vs. Changes in Body Composition						
	PRT Group			SHAM group			PRT Group			SHAM group			
<b>Measures of body composition</b>													
	<b>n</b>	<b>r</b>	<b>p</b>	<b>n</b>	<b>r</b>	<b>p</b>	<b>n</b>	<b>r</b>	<b>p</b>	<b>n</b>	<b>r</b>	<b>p</b>	
Body weight	31	0.16	0.4	37	-0.2	0.23	36	0.08	0.66	47	0.19	0.21	
BMI (kg/m <sup>2</sup> )	31	0.13	0.47	37	-0.22	0.19	36	0.05	0.79	47	0.19	0.21	
Skeletal muscle mass (kg)	31	-0.38	0.04	36	-0.16	0.35	36	-0.06	0.73	45	0.21	0.17	
Total fat mass (kg)	31	0.42	0.02	36	-0.11	0.51	36	0.13	0.45	45	0.01	0.96	
VAT (cm <sup>2</sup> )	31	0.31	0.09	35	-0.28	0.10	36	0.13	0.47	45	0.04	0.79	
Mid-thigh CSA (cm <sup>2</sup> )	31	-0.02	0.93	36	-0.12	0.50	36	-0.02	0.89	46	0.22	0.15	
Mid-thigh muscle attenuation	31	0.05	0.79	36	-0.24	0.15	36	0.52	0.001	46	<0.01	0.98	

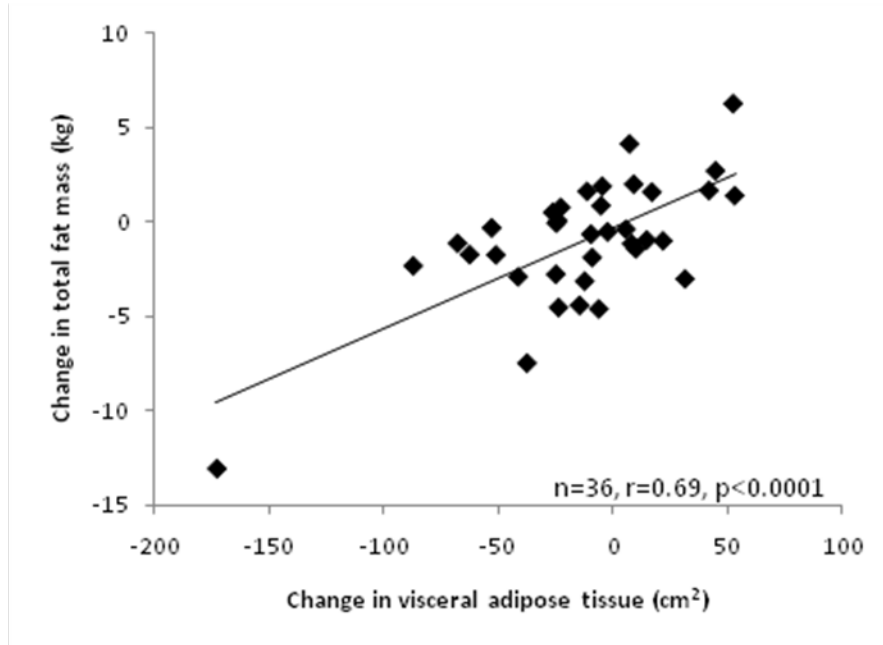
**Supplementary Figure 1. CONSORT 2010 Flow Diagram**



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**Supplementary Figure 2.** Changes in visceral adipose tissue vs. changes in total body fat

**a. PRT Group.**



**b. SHAM Group**

