Mythes over bewegen om af te vallen

PROF. DR. DOMINIQUE HANSEN
UNIVERSITEIT HASSELT

Myth 1

Exercise is always effective to tackle obesity…no matter what exercise

European Guidelines for Obesity Management in Adults

Obes Facts 2015;8:402–424

Management

Nutrition
Reduce energy intake by 500–1,000 kcal/day
Physical activity
Initially at least 150 min/week moderate aerobic exercise combined with 1–3 sessions/week resistance exercise
Cognitive behaviour therapy
Pharmacotherapy
BMI ≥ 30 kg/m^2 or BMI ≥ 27 kg/m^2 with co-morbidities
Adjunct to lifestyle modification
Bariatric/metabolic surgery
BMI≥40 kg/m^2 or BMI between 35.0–39.9 kg/m^2 + co-morbidities or BMI between 30.0-34.9 kg/m^2 with type 2 diabetes on individual basis. Consider if other weight loss attempts fail; requires lifelong medical monitoring
Prevention and treatment of co-morbidities

J Am Diet Assoc. 2007;107:1755-1767

Weight-Loss Outcomes: A Systematic Review and Meta-Analysis of Weight-Loss Clinical Trials with a Minimum 1-Year Follow-Up

MARION J. FRANZ, MS, RD; JEFFREY J. VanWORMER, MS; A. LAUREN CRAIN, PhD; JACKIE L. BOUCHER, MS, RD; TRINA HISTON, PhD; WILLIAM CAPLAN, MD; JILL D. BOWMAN; NICOLAS P. PRONK, PhD

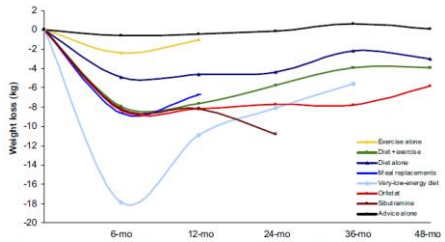


Figure 1. Average weight loss of subjects completing a minimum 1-year weight-management intervention; based on review of 80 studies (N=26,455; 18,199 completers [69%]).

The Role of Exercise and Physical Activity in Weight Loss and Maintenance

Damon L. Swift[a,b,*], Neil M. Johannsen[c,e], Carl J. Lavie[c,f], Conrad P. Earnest[d], Timothy S. Church[c]

Table 1 – Expected initial weight loss and possibly of producing clinically significant weight loss from different modalities of exercise training.

Modality	Weight Loss	Clinically Significant Weight Loss
Pedometer-based step goal	Range: 0–1 kg of weight loss	Unlikely
Aerobic exercise training only	Range: 0–2 kg of weight loss	Possible, but only with extremely high exercise volumes
Resistance training only	None	Unlikely
Aerobic and resistance training only	Range: 0–2 kg of weight loss	Possible, but only with extremely high volumes of aerobic exercise training
Caloric restriction combined with aerobic exercise training	Range: −9 kg to −13 kg	Possible

PROGRESS IN CARDIOVASCULAR DISEASES 56 (2014) 441–447

The Role of Exercise and Physical Activity in Weight Loss and Maintenance

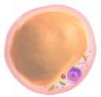
Damon L. Swift[a,b,*], Neil M. Johannsen[c,e], Carl J. Lavie[c,f], Conrad P. Earnest[d], Timothy S. Church[c]

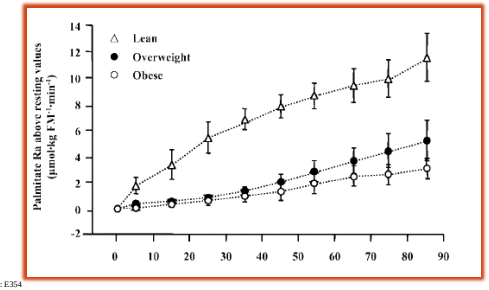
Recommendations for Physical Activity:

- **Maintaining and improving health:** 150 minutes per week
- **Prevention of weight gain:** 150-250 minutes per week
- **Promote clinically significant weight loss:** 225-420 minutes per week
- **Prevention of weight gain after weight loss:** 200-300 minutes per week

PROGRESS IN CARDIOVASCULAR DISEASES 56 (2014) 441–447

Fat mobilisation during exercise in obesity

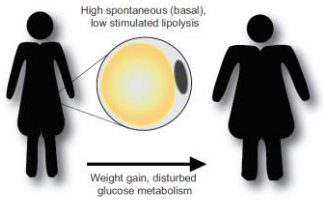




Mittendorfer B, et al. Am J Physiol 2004; 286: E354

Disturbed fat mobilisation = problem

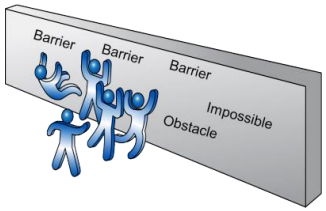
Cell Metabolism 28, 45–54, July 3, 2018



Weight Gain and Impaired Glucose Metabolism in Women Are Predicted by Inefficient Subcutaneous Fat Cell Lipolysis

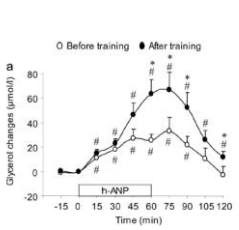
Peter Arner[1,*] Daniel P. Andersson,[1] Jesper Bäckdahl,[1] Ingrid Dahlman,[1] and Mikael Rydén[1,2,*]

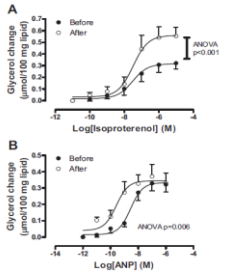
Is this problem reversible by exercise?



Moro C, et al. J Clin Endocrinol Metab 2009; 94: 2579-86
Moro C, et al. Med Sci Sports Exerci 2005; 37: 1126-32

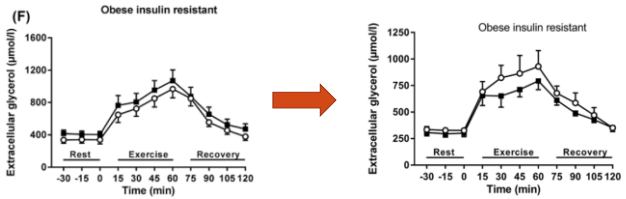
Can we upregulate lipolysis in obesity?





Clinical Science (2018) **132** 1685–1698

Can we upregulate lipolysis in obesity?

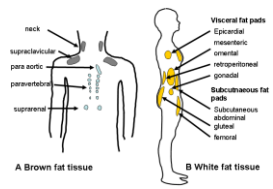


drenergically and non-adrenergically mediated
uman adipose tissue lipolysis during acute exercise
nd exercise training

Myth 2

Because exercise does not always have a profound impact of body weight, it is better to choose for dietary treatment

Site-specific fat mass loss by exercise



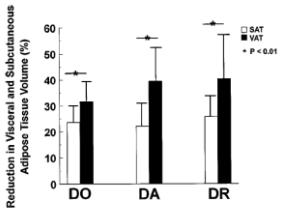
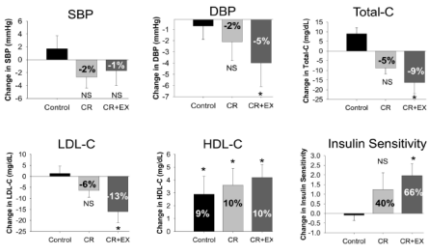


Fig. 3. Relative reduction in VAT and SAT volume in response to diet only (DO; $n = 11$), diet and aerobic exercise (DA; $n = 11$), or diet and resistance exercise (DR; $n = 11$). Values are means ± SD. n, No. of subjects.

Ross R, et al J Appl Physiol 1996; 81: 2445-55

Impact of exercise on CVD risk



* Significant change from baseline

Larson-Meyer DE, et al. Med Sci Sports Exerc 2010; 42: 152

Preservation of muscle by exercise

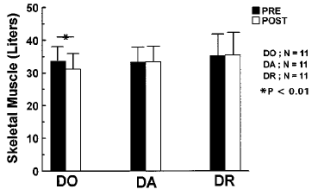
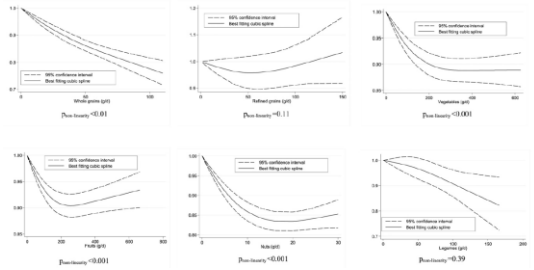


Fig. 8. Pre and Post whole body SM tissue volume values for DO, DA, and DR groups. Values are means ± SD.

Ross R, et al J Appl Physiol 1996; 81: 2445-55

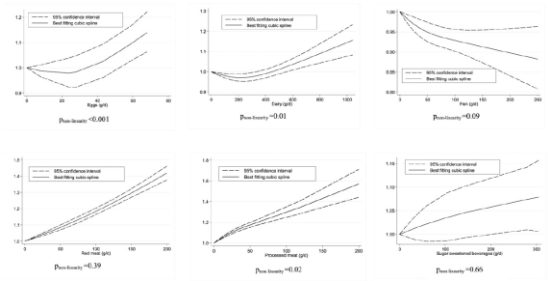
Am J Clin Nutr 2017;105:1462–73.

Food groups and risk of all-cause mortality: a systematic review and meta-analysis of prospective studies[1,2]



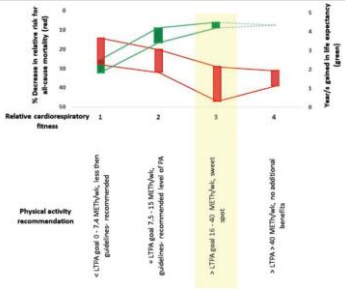
Am J Clin Nutr 2017;105:1462–73.

Food groups and risk of all-cause mortality: a systematic review and meta-analysis of prospective studies[1,2]



European Heart Journal (2018) **39**, 2346–2355

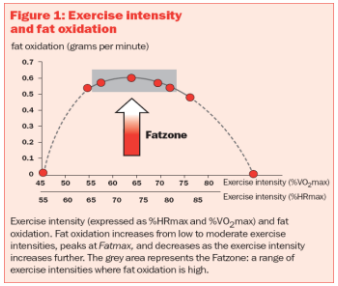
Personalized exercise dose prescription



Myth 3

You should exercise at a level that maximizes fat oxidation, wright?

Low-intense exercise: why?



Exercise intensity (expressed as %HRmax and %VO_2max) and fat oxidation. Fat oxidation increases from low to moderate exercise intensities, peaks at *Fatmax*, and decreases as the exercise intensity increases further. The grey area represents the Fatzone: a range of exercise intensities where fat oxidation is high.

Individualized Exercise Training at Maximal Fat Oxidation Combined with Fruit and Vegetable-Rich Diet in Overweight or Obese Women: The LIPOXmax-Réunion Randomized Controlled Trial

Table 3. Five-month changes in anthropometric and body composition in LIPOXmax-Réunion randomized controlled trial participants.

	G1: LIPOXmax	G2: 60% VO2max	G3: GPP at home	p-value	G1 *vs* G2	G1 *vs* G3	G2 *vs* G3
	n = 33	n = 39	n = 37				
DXA characteristics							
Weight (kg)	-5.0 (-6.5 to -3.4)	-5.4 (-6.8 to -4.0)	-3.5 (-5.0 to -2.1)	0.172	-	-	-
BMI (kg/m²)	-1.8 (-2.4 to -1.2)	-2.1 (-2.7 to -1.6)	-1.4 (-2.0 to -0.9)	0.194	-	-	-
Fat Free Mass (kg)	-0.8 (-1.2 to -0.3)	-0.7 (-1.1 to -0.3)	0.0 (-0.4 to 0.4)	**0.026**	0.820	**0.010**	0.032
Fat Free Mass (%)	2.2 (1.3 to 3.1)	2.7 (1.9 to 3.6)	2.6 (1.7 to 3.4)	0.703	-	-	-
Fat Mass (kg)	-4.1 (-5.4 to -2.7)	-4.7 (-5.9 to -3.5)	-3.5 (-4.8 to -2.3)	0.135*	-	-	-
Fat Mass (%)	-2.3 (-3.3 to -1.4)	-2.9 (-3.8 to -2.0)	-2.7 (-3.6 to -1.8)	0.663	-	-	-
Truncal Fat Mass (kg)	-2.4 (-3.3 to -1.5)	-3.0 (-3.8 to -2.2)	-2.1 (-2.9 to -1.3)	0.245	-	-	-
Android Fat Mass (kg)	-0.5 (-0.6 to -0.3)	-0.6 (-0.7 to -0.4)	-0.4 (-0.5 to -0.2)	0.169	-	-	-
Gynoid Fat Mass (kg)	-0.8 (-1.0 to -0.5)	-0.8 (-1.1 to -0.6)	-0.7 (-0.9 to -0.4)	0.441*	-	-	-
Truncal Fat Free Mass (kg)	-0.5 (-0.9 to -0.1)	-0.7 (-1.1 to -0.4)	-0.2 (-0.6 to 0.1)	0.148	-	-	-
Android Fat Free Mass (g)	-95.1 (-158.3 to -31.8)	-112.1 (-171.0 to -53.2)	-11.9 (-71.6 to 47.9)	**0.046**	0.702	0.059	0.020
Gynoid Fat Free Mass (g)	-139.5 (-268.2 to -10.8)	-157.3 (-277.2 to -37.3)	39.7 (-81.8 to 161.3)	0.100*	-	-	-

PLOS ONE | DOI:10.1371/journal.pone.0139246 November 10, 2015 80 / 90

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Individualized Exercise Training at Maximal Fat Oxidation Combined with Fruit and Vegetable-Rich Diet in Overweight or Obese Women: The LIPOXmax-Réunion Randomized Controlled Trial

Table 4. Longitudinal evolution of metabolic characteristics (month-0, month-3 and month-5) in LIPOXmax-Réunion randomized controlled trial participants.

	G1: LIPOXmax			G2: 60% VO2max			G3: GPP at home			Repeated-measures ANOVA		
	n = 33			n = 35			n = 35			p-values		
	M0	M3	M5	M0	M3	M5	M0	M3	M5	t	g	t x g
Lipid profile												
Total Cholesterol (mmol/L)	4.5 ± 0.8	4.5 ± 0.9	4.4 ± 0.9	4.5 ± 0.8	4.5 ± 0.8	4.4 ± 0.8	4.5 ± 0.9	4.4 ± 0.8	4.3 ± 0.8	0.085	0.978	0.436
LDL Cholesterol (mmol/L)	2.8 ± 0.7	2.7 ± 0.7	2.7 ± 0.7	2.7 ± 0.7	2.8 ± 0.8	2.6 ± 0.7	2.8 ± 0.8	2.7 ± 0.7	2.5 ± 0.7	< 0.001	0.910	0.283
HDL Cholesterol (mmol/L)	1.2 ± 0.3	1.3 ± 0.3	1.3 ± 0.3	1.2 ± 0.3	1.3 ± 0.3	1.4 ± 0.3	1.3 ± 0.3	1.3 ± 0.2	1.4 ± 0.3	< 0.001	0.521	0.245
HDL-C/LDL-C ratio	0.46 ± 0.18	0.51 ± 0.21	0.52 ± 0.20	0.47 ± 0.18	0.51 ± 0.21	0.58 ± 0.24	0.50 ± 0.19	0.54 ± 0.25	0.63 ± 0.29	< 0.001	0.486	0.259
Triglycerides (mmol/L)	1.0 ± 0.3	1.0 ± 0.4	0.9 ± 0.4	1.1 ± 0.7	1.1 ± 0.4	1.0 ± 0.4	1.1 ± 0.6	0.9 ± 0.4	0.9 ± 0.4	0.150	0.492	0.492
Glucose profile												
HbA1c %	5.6 ± 0.4	5.4 ± 0.3	5.4 ± 0.4	5.6 ± 0.3	5.5 ± 0.3	5.4 ± 0.3	5.4 ± 0.3	5.3 ± 0.2	5.3 ± 0.2	< 0.001	0.149	0.161
Fasting plasma glucose (mmol/L)	5.0 ± 0.4	4.9 ± 0.3	4.9 ± 0.4	5.0 ± 0.5	5.0 ± 0.4	5.0 ± 0.5	4.9 ± 0.4	4.9 ± 0.4	4.9 ± 0.5	0.395	0.539	0.580
Insulin (m UI/L)	22.8 ± 9.7	18.2 ± 12.8	16.0 ± 9.0	20.4 ± 9.4	15.4 ± 6.6	15.0 ± 5.4	16.5 ± 7.0	15.4 ± 7.9	14.6 ± 6.6	< 0.001	0.186	0.015
HOMA-IR index	5.2 ± 2.5	4.0 ± 2.9	3.6 ± 2.3	4.5 ± 2.1	3.4 ± 1.5	3.4 ± 1.4	3.6 ± 1.6	3.4 ± 1.8	3.2 ± 1.5	< 0.001	0.164	0.011
Maximal Lipid Oxidation												
MFO (mg/min)	146.5 ± 37.1	212.8 ± 39.0	218.5 ± 49.7	145.1 ± 41.1	209.5 ± 38.7	192.7 ± 44.9	165.8 ± 52.1	191.3 ± 46.7	186.0 ± 48.4	< 0.001	0.262	< 0.001
MFO (mg/min/kg FFM) (n = 109)	3.3 ± 0.8	-	5.0 ± 1.2	3.3 ± 1.0	-	4.5 ± 1.0	3.8 ± 1.0	-	4.2 ± 0.9	< 0.001	0.691	< 0.001

PLOS ONE | DOI:10.1371/journal.pone.0139246 November 10, 2015 80 / 90

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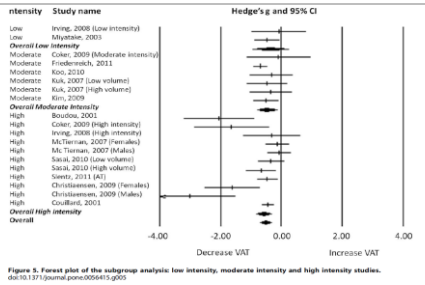
The Effect of Exercise on Visceral Adipose Tissue in Overweight Adults: A Systematic Review and Meta-Analysis

Dirk Vissers[1*], Wendy Hens[1], Jan Taeymans[2], Jean-Pierre Baeyens[3], Jacques Poortmans[4], Luc Van Gaal[1,5]



PLOS ONE
February 2013 | Volume 8 | Issue 2 | e56415

Figure 5. Forest plot of the subgroup analysis: low intensity, moderate intensity and high intensity studies.
doi:10.1371/journal.pone.0056415.g005

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Myth 4

Bring on the heavy weights!

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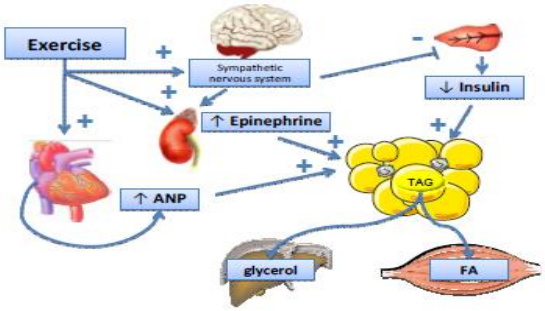
Local muscle exercise = local fat mass loss?

Local muscle exercise = local fat mass loss?



Cedric Moro
Adapted from: Hansen D, Exercise therapy in adult individuals with obesity. 2013, Nova Science Publishers, NY, USA

'Regular' strength training?

PLOS ONE

Impact of Different Training Modalities on Anthropometric and Metabolic Characteristics in Overweight/Obese Subjects: A Systematic Review and Network Meta-Analysis

Lukas Schwingshackl[1*], Sofia Dias[2], Barbara Strasser[3], Georg Hoffmann[1]

Table 2. Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference for the effects of AET vs. RT, CT vs. AET and CT vs. RT on anthropometric outcomes, blood lipids and cardiorespiratory fitness.

Outcomes	No. of Studies	Sample Size	MD	95% CI	p-values	Inconsistency I^2	Egger test
AET vs. RT							
BW (kg)	14	560	−1.15	[−2.23, −0.07]	0.04	34%	0.032
WC (cm)	10	410	−1.10	[−1.85, −0.36]	0.004	0%	0.742
WHR	8	232	−0.01	[−0.02, 0.01]	0.48	82%	0.156
FM (kg)	8	415	−1.14	[−1.83, −0.45]	0.001	3%	0.277
LBM (kg)	7	335	−1.26	[−1.81, −0.71]	<0.00001	0%	0.883
TC (mg/dl)	7	230	−2.40	[−10.29, 5.50]	0.55	0%	0.270
LDL-C (mg/dl)	6	208	−3.69	[−14.91, 7.52]	0.52	46%	0.841
HDL-C (mg/dl)	8	291	1.49	[−0.18, 3.16]	0.08	0%	0.203
TG (mg/dl)	7	272	−7.63	[−22.61, 7.34]	0.32	0%	0.481
VO2max (ml/kg/min)	7	260	2.53	[1.62, 3.44]	<0.00001	0%	0.362

December 2013 | Volume 8 | Issue 12 | e82853

PLOS ONE

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Outcomes	No. of Studies	Sample Size	MD	95% CI	p-values	Inconsistency I^2	Egger test
CT vs. AET							
BW (kg)	4	184	0.34	[−0.39, 1.08]	0.36	0%	0.141
WC (cm)	3	168	−0.14	[−1.03, 0.76]	0.77	0%	0.688
FM (kg)	4	184	−0.56	[−1.34, 0.22]	0.16	0%	0.234
LBM (kg)	3	112	0.90	[0.31, 1.48]	0.003	0%	0.600
HDL-C (mg/dl)	3	92	0.76	[−1.30, 2.81]	0.47	0%	0.079
TG (mg/dl)	3	92	0.19	[−19.47, 19.86]	0.98	0%	0.297
VO2max (ml/kg/min)	4	172	−0.04	[−1.47, 1.39]	0.96	25%	0.024

December 2013 | Volume 8 | Issue 12 | e82853

Myth 5

Burn 7000 kcal = 1 kg fat mass loss

Predicting fat mass loss?

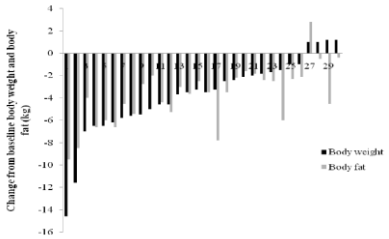
$$PV = \left[\sum_{t=0}^{N} \left(\frac{\max\left\{F_t^{l(y)}, 0\right\}}{\prod_{t'=0}^{t}\left(1+R_{t'}^{r(y)}\right)} + \frac{\min\left\{F_t^{l(y)}, 0\right\}}{\prod_{t'=0}^{t}\left(1+R_{t'}^{l(y)}\right)} \right), \right.$$
$$\left. \sum_{t=0}^{N} \left(\frac{\max\left\{F_t^{r(y)}, 0\right\}}{\prod_{t'=0}^{t}\left(1+R_{t'}^{l(y)}\right)} + \frac{\min\left\{F_t^{r(y)}, 0\right\}}{\prod_{t'=0}^{t}\left(1+R_{t'}^{r(y)}\right)} \right) \right]. \quad (6)$$

Predicting fat mass loss?

Inactive way	Kcals used	Active way	Kcals used
Use TV remote	<1	Get up to change channel	3
Phone calls 30 min, reclining	4	Phone calls 30 min, standing	20
Hire home help	0	Iron 30 min, vacuum 30 min	152
Heat up a microwave meal	15	Cook 30 min	25
Buy pre-sliced vegetables	0	Prepare vegetables	10–13
Use leaf blower 30 min	100	Rake leaves 30 min	150
Hire a gardener	0	Garden or mow lawn 30 min	360
Use car wash	18	Wash and wax car 1 hour	300
Let dog out of back door	2	Walk dog 30 min	125
Drive 40 min, walk 5 min	22	Walk 15 min to bus	60
Email a friend, 4 min	2–3	Walk 1 min, stand and talk 3 min	6
Take lift up three floors	0.3	Climb three flights stairs	15
Park at door of supermarket	0.3	Park and walk 2 min	1.6
Watch TV for 1 hour	30	Walk and shop 1 hour	145

Inactive way	Active way
Uses 1,700 kcals per month	Uses 10,500 kcals per month

Variance in fat mass loss



Reprinted by permission from Macmillan Publishers Ltd: Int J Obes: King, Hopkins, Caudwell, Stubbs, Blundell [4].

Variance in fat mass loss

Fat intake and absorption factors

Reduced fat intake
Change in type of fat
Genes and appetite
Satiety hormones
Eating traits
Nutrients affecting absorption
Exercise and appetite

Fat mass change

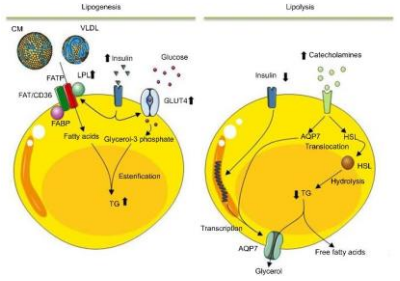
Fat oxidation factors

Genes
Gene/nutrient interaction
Nutrients
Post-prandial status
Body composition
Endocrine influence
SNS activity
Resting metabolic rate
Environmental influences
Sleep quality
Exercise characteristics

Myths 6

Let's exercise in a fasted state!

Why do we believe this?



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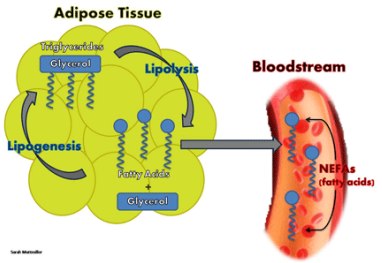

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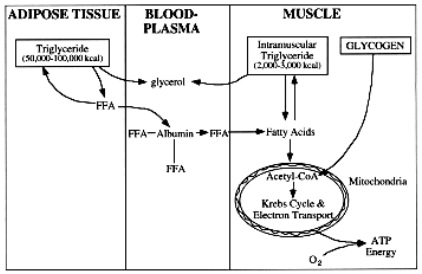


Why do we believe this?

British Journal of Nutrition (2016), 116, 1153–1164

Study name	Difference in means	SE	Variance	Lower limit	Upper limit	Z-value	P
Bergman & Brooks, 1999a	−7·87	7·65	58·57	−22·87	7·13	−1·03	0·304
Bergman & Brooks, 1999b	−4·49	5·24	27·46	−14·76	5·78	−0·86	0·391
Farah & Gill, 2013	−5·70	1·84	3·38	−9·30	−2·10	−3·10	0·002
Gonzalez *et al.*, 2013	−6·00	4·46	19·86	−14·74	2·74	−1·35	0·178
Isacco *et al.*, 2012a	−4·59	1·86	3·48	−8·24	−0·94	−2·46	0·014
Isacco *et al.*, 2012b	−1·74	1·20	1·45	−4·10	0·62	−1·45	0·148
Little *et al.*, 2010	−5·15	3·43	11·74	−11·87	1·57	−1·50	0·133
Massicotte *et al.*, 1990	−5·00	4·99	24·99	−14·80	4·80	−1·00	0·317
Maughan & Gleeson, 1988	−0·90	7·63	58·27	−15·86	14·06	−0·12	0·906
Paul *et al.*, 1996	−41·40	17·54	307·60	−75·78	−7·03	−2·36	0·018
Whitley *et al.*, 1998	−14·38	9·67	93·52	−33·33	4·57	−1·49	0·137
Willcutts *et al.*, 1988	−2·62	1·02	1·04	−4·62	−0·62	−2·57	0·010
Wu *et al.*, 2003	−18·10	5·16	26·65	−28·22	−7·98	−3·51	0·000
	−3·53	0·63	0·40	−4·76	−2·30	−5·62	0·000

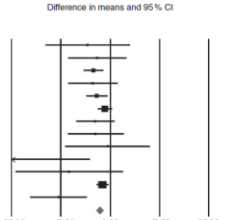


Fig. 4. Fat oxidation (g) during exercise performed in the fasted state *v.* fed state. ■, Study-specific estimates: ◆, pooled estimates of fixed-effects meta-analyses.

Effects of aerobic exercise performed in fasted *v.* fed state on fat and carbohydrate metabolism in adults: a systematic review and meta-analysis

J. Funct. Morphol. Kinesiol. 2017, 2, 43; doi:10.3390/jfmk2040043

Exercise in the fasted state: long-term effect

Table 2. The effects of fasted versus fed exercise on weight loss and composition.

Study	Fasted Exercise					Fed Exercise					Between Groups
	n	Pre-Training	Post-Training	Hedges' g	95% CI	n	Pre-Training	Post-Training	Hedges' g	95% CI	Hedges' g	95% CI	p
Body Mass (Males)													
De Bock et al. [19]	10	74.3 ± 2.8	74.2 ± 3.0	−0.03 (0.29)	−0.60 to 0.54	10	75.3 ± 3.0	75.5 ± 2.9	0.06 (0.29)	−0.51 to 0.63	0.10 (0.43)	−0.74 to 0.94	0.82
Van Proeyen et al. [21]	10	73.3 ± 9.8	74.1 ± 8.8	0.08 (0.29)	−0.49 to 0.65	10	70.2 ± 13.4	71.6 ± 10.7	0.12 (0.29)	−0.45 to 0.69	0.06 (0.43)	−0.78 to 0.90	0.89
Van Proeyen et al. [22]	10	76.0 ± 4.6	75.8 ± 4.3	−0.04 (0.33)	−0.65 to 0.53	10	77.6 ± 3.7	76.9 ± 3.4	−0.16 (0.29)	−0.75 to 0.39	−0.12 (0.43)	−0.96 to 0.72	0.77
Main Effect	-	-	-	0.01 (0.17)	−0.33 to 0.33	-	-	-	0.01 (0.17)	−0.33 to 0.33	0.02 (0.20)	−0.36 to 0.41	0.90
Body Mass (Females)													
Gilken et al. [18]	8	79.0 ± 35.0	79.0 ± 35.0	0.03 (0.35)	−0.62 to 0.62	8	77.0 ± 32.0	77.0 ± 33.0	0.01 (0.35)	−0.62 to 0.62	0 (0.47)	−0.93 to 0.93	1.00
Schoenfeld et al. [20]	10	62.4 ± 7.8	60.8 ± 7.8	−0.19 (0.29)	−0.76 to 0.39	10	62.0 ± 5.5	63.0 ± 5.7	−0.16 (0.30)	−0.73 to 0.41	0.08 (0.43)	−0.76 to 0.92	0.84
Main Effect	-	-	-	−0.10 (0.23)	−0.52 to 0.32	-	-	-	−0.09 (0.23)	−0.51 to 0.33	0.05 (0.32)	−0.58 to 0.67	0.88
Body Mass (Combined)													
Main Effect	-	-	-	−0.04 (0.13)	−0.30 to 0.22	-	-	-	−0.03 (0.13)	−0.29 to 0.23	0.02 (0.20)	−0.36 to 0.41	0.90
% Body Fat (Females)													
Gilken et al. [18]	8	42.3 ± 8.1	41.6 ± 7.8	−0.08 (0.32)	−0.70 to 0.54	8	40.9 ± 5.8	40.1 ± 5.4	−0.13 (0.32)	−0.75 to 0.49	0.01 (0.47)	−0.91 to 0.94	0.98
Schoenfeld et al. [20]	10	26.3 ± 7.9	25.0 ± 7.7	−0.15 (0.29)	−0.72 to 0.42	10	24.8 ± 8.4	24.1 ± 8.5	−0.08 (0.29)	−0.64 to 0.49	0.07 (0.43)	−0.77 to 0.91	0.87

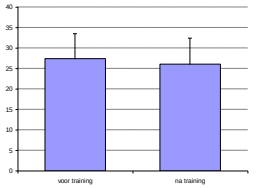
Study	Fasted Exercise					Fed Exercise					Between Groups
	n	Pre-Training	Post-Training	Hedges' g	95% CI	n	Pre-Training	Post-Training	Hedges' g	95% CI	Hedges' g	95% CI	p
Mean Effect	-	-	-	−0.12 (0.23)	−0.54 to 0.30	-	-	-	−0.10 (0.23)	−0.52 to 0.32	0.05 (0.32)	−0.58 to 0.67	0.89
Lean Mass (Females)													
Gilkeret al. [18]	8	42.6 ± 5.5	43.3 ± 5.5	0.08 (0.32)	−0.54 to 0.70	8	43.5 ± 8.2	44.1 ± 7.8	0.07 (0.32)	−0.55 to 0.68	0.01 (0.47)	−0.91 to 0.94	0.98
Schoenfeld et al. [20]	10	45.9 ± 6.7	45.4 ± 6.1	−0.07 (0.29)	−0.64 to 0.50	10	46.3 ± 3.8	46.1 ± 4.3	−0.05 (0.29)	−0.61 to 0.52	0.05 (0.43)	−0.79 to 0.89	0.90
Mean Effect	-	-	-	0.01 (0.21)	−0.42 to 0.42	-	-	-	0.01 (0.21)	−0.41 to 0.42	0.04 (0.32)	−0.59 to 0.66	0.91

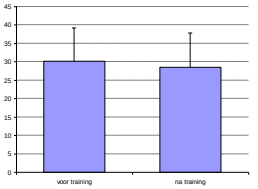
Statistical significance accepted as $p \leq 0.05$; % = Percentage; CI = Confidence interval. Data are mean ± SD. Statistical significance accepted as $p \leq 0.05$.

Review

Effect of Overnight Fasted Exercise on Weight Loss and Body Composition: A Systematic Review and Meta-Analysis

Exercise in the fasted state: long-term effect





Hansen D, et al. Study finished

Horowitz, Jeffrey F., Ricardo Mora-Rodriguez, Lauri O. Byerley, and Edward F. Coyle. Lipolytic suppression following carbohydrate ingestion limits fat oxidation during exercise. *Am. J. Physiol.* 273 (*Endocrinol. Metab.* 36): E768–E775, 1997.

Be carefull with what you consume…

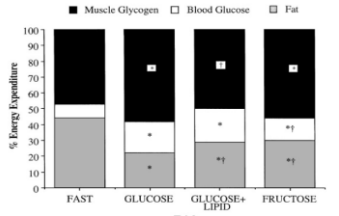


Fig. 7. Percent energy expenditure derived from muscle glycogen, blood glucose, and fat during 20- to 30-min period of exercise. * Significantly different from Fast, $P < 0.05$. † Significantly different from Glucose, $P < 0.05$.

Take-home messages

Do no longer follow, or spread, these myths in the treatment of obesity:

- Any type of exercise will do
  - Go for high-volume aerobic exercise
- Skip the exercise…diet is more important
  - Go for a combination of treatments to maximize clinical effects
- Go for slow!
  - No, go for a sufficient exercise intensity (moderate-intense)
- Go for strength training
  - No, go for a combination of (predominantly) endurance and strength training
- Let's calculate and predict your fat mass loss
  - It is impossible to predict this…
- Exercise should be executed in fasted state
  - No, just have your breakfast