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3600 cal/lb is the value for adult human weight loss at 0%, 52% and 100% fasting rate, averaged

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Abstract
The author did a study of 51 diets, 22 males and 29 females of varying levels of calorie intake. What was calculated was the calories per kilogram for weight loss among that group, that is, Dk = 7740.32 ± 1548.87 cal/kg. In this paper there is a comparison of this figure to that of 4 individuals out of the 51 who underwent total fasting, Ce = 0. It was found that the cal/kg was higher with a significantly smaller standard deviation. However, in studies of this sort an error of 10% is to be expected, so this is within experimental error. We proved here that the cal/kg is independent across the entire fasting range. The author speculates that digestion is independent of physical activity.

Keywords: Energy Intake, Fasting Range, Calorie Restriction, Rate of Weight Loss, Digestion and Physical Activity

1. Aims and Scope

(Jennings, 2012) [4] has the formula for weight loss and calorie intake, where Dk is the conversion factor for weight in kilograms. Co is the normal calorie intake per day, Ce is the actual calories eaten, RMR is the resting metabolic rate, $(dW/dt)_o$ is the weight loss per day at the start of the linear weight decline in the fast and F_A is the activity factor. Generally, $1.3 < F_A < 1.9$, but a bit lower for women. Equations (1) and (2) are the starting equations in this study.

$$\mathrm{Co} = (\mathrm{RMR})\ (F_A) \tag{1}$$

$$\mathrm{Dk}\ (dW/dt)_o = -\ (\mathrm{Co} - \mathrm{Ce}) \tag{2}$$

The point of this paper is to establish that cal/kg weight loss is independent across the entire fasting range. The best figure for Dk is 7770 cal/kg, (Kozusko, 2001) [5] but we use Dk = 7740.32 ± 1548.87 cal/kg as the value for 52% fasting (Jennings, page 285, 2012) [4]. According to (Wishnofsky, 1958) [6], 3500 cal/lb = D is universally accepted.
3500 cal/lb x 2.2046225 lb/kg = 7716.18 cal/kg ± 10 %, because for these studies an error of 10% is to be expected (Cunningham, 1980 [1] in IJRRAS, page 541, 2012 [3]). According to (Cunningham, 1980) [1] RMR is solely a function of lean body mass LBM by formula (3), where LBM is given as a function of height and weight with separate coefficients for men and women (Hume, 1966 [2] in Jennings, page 284, 2012 [4]) in (4) men and (5) women. W_o is in kg, ht in cm, LBM in kg, and RMR in cal/day.

$$\mathrm{RMR} = 501.6 + 21.6\ (\mathrm{LBM}) \tag{3}$$

$$\mathrm{LBM\ (men)} = 0.32810\ (W_o) + 0.33929\ (\mathrm{ht}) - 29.5336 \tag{4}$$

$$\mathrm{LBM\ (women)} = 0.29569\ (W_o) + 0.41813\ (\mathrm{ht}) - 43.2933 \tag{5}$$

For Equations (3), (4) and (5), this means that calculations for Dk can be compared between men and women because Dk is solved for in Eq. (2). For this study, we are dealing with diets that have Ce = 0.

2. Results

From (Jennings, page 283, 2012) [4] we find the data for RMR, F_A, Ce and $(dW/dt)_o$ for three men and one woman. These data can be averaged and a standard deviation for Dk is calculated from this table.

Table 1: The data for RMR, F_A, Ce and $(dW/dt)_o$ for three men and one woman

	RMR cal/day	F_A	Ce	$(RMR)(F_A)$ = Co cal/day	$(dW \text{ kg/day} /dt)_o$	Dk = - Co / $(dW/dt)_o$ cal/kg
#5, male	1364.56	1.55	0	2115.068	- 0.30718	6885.435
#6, male	1434.1	1.55	0	2222.855	- 0.21667	10259.173
#7, male	1558.86	1.55	0	2416.233	- 0.30429	7940.56
#18, female	1463.27	1.3	0	1902.251	- 0.225	8454.449

Taking the four total fasting points together, we have Dk = 8384.904 ± 1092.11 cal/kg and rounding is only done at the end. The error bars for 0%, 52% and 100% fasting rate overlap, so the data proved the author's statement (Jennings, 2012) [4] that Dk is independent of fasting rate.

Table 2: Fasting rate

Fasting rate (Co – Ce)/Co	Result for Dk cal/kg	Study	
100%	8384.9 ± 13%	(This study)	Average for Dk = 7947.1 cal/kg
52%	7740.3 ± 20%	(Jennings, 2012) [4]	Average for D = 3604.8 cal/lb
0%	7716.2 ± 10%	(Wishnofsky, 1958) [6]	

3. Discussion

One would want to speculate why the calories per pound, Dk, for weight loss does not depend on the fasting rate as shown here. The author thinks it is because the resting metabolic rate is only a function of the lean body mass, so among other things it means Dk can be compared between men and women. I suspect that digestion is independent of physical activity, so Co = (RMR) (F_A). That is why Co, the normal calorie intake, is decomposed into two independent variables, RMR and F_A.

A corollary to (2) is when the individual is sleeping (6). One would presume to think that $F_A = 1$ when one is at rest, sleeping or in a coma. Thus, we have the following for American units in that case.

$$(dW/dt) = - RMR/D \qquad (6)$$

During 1985-86, the author went through a series of two fasts and the data is published in (Jennings, 2012) [4]. Over a period of 9 ½ months he was able to lose about 50 pounds of weight. Thus, fasting can be used to lose body weight under the supervision of a doctor.

4. Conclusions

We can easily see that (Jennings, 2012) [4] conclusion of Dk being constant all across the fasting range is true, which means that doctors doing fasts for patients to do weight loss is justified: they overlap. Any percent fasting could be used for a patient to lose weight.

Table 3: Nomenclature

Ce	Calories eaten per day
Co	Normal daily calorie intake
D	Calories to lose one pound in American units
Dk	Calories to lose one kilogram of weight
F_A	Activity factor
ht	Height of individual
k	Conversion factor, 2.2046225 lb/kg
LBM	Lean Body Mass
RMR	Resting Metabolic Rate, also known as basal metabolic rate, cal/day
W	Weight in pounds
W_o	Body weight
(dW/dt)	Daily weight loss for a person totally at rest
$(dW/dt)_o$	Weight loss rate at beginning of linear period

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6. References

1. Cunningham J. A reanalysis of the factors influencing basal metabolic rate in normal adults. Am. J. Clin. Nutr. 1980; 33:2372-2374.
2. Hume R. Prediction of lean body mass from height and weight. J. Clin. Pathol. 1966; 19:389-391.
3. IJRRAS JH Jennings. Metabolism is universal, IJRRAS. 2012; 13(2):540-548.
4. Jennings JH, Lesser M. Weight loss and calorie restriction at 50% fasting rate. Pakistan J. Nutr. 2012; 11(3):282-287.
5. Kozusko FP. Body weight setpoint, metabolic adaptation and human starvation. Bull. Math. Biol. 2001; 63:393-404.
6. Wishnofsky M. Caloric equivalents of gained or lost weight. Am. J. Clin. Nutr. 1958; 6:542-546.