



Correction to: A mathematical model of the effects of resistance exercise-induced muscle hypertrophy on body composition

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Correction to:

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There is a typo in the original equation describing lean mass, and it has also been pointed out to the authors that the model is not strictly energy balanced. This corrigendum aims to correct these issues by clarifying Eq. 8 in the original manuscript, stating that the model is not energy balanced and describing how the model could be energy balanced and how the results would change only marginally.

Corrigendum:

Page 450, paragraph 5: Model Development.
Original Eq. 8:

$$\frac{dL}{dt} = p \left(EI - EE - \rho_G \frac{dG}{dt} \right) + r \frac{L^\alpha}{L^\alpha + H_1^\alpha} \frac{1}{1 + \left(\frac{L}{H_2} \right)^\beta}$$

Corrected Eq. 8:

$$\frac{dL}{dt} = p \left(EI - EE - \rho_G \frac{dG}{dt} \right) / \rho_L + r \frac{L^\alpha}{L^\alpha + H_1^\alpha} \frac{1}{1 + \left(\frac{L}{H_2} \right)^\beta}$$

The Torres et al. model is not energy balanced because the right hand sides of the equations describing energy

partitioning do not sum to zero. By subtracting the muscle hypertrophy term from the fat equation as shown

$$\frac{dF}{dt} = (1 - p) \left(EI - EE - \rho_G \frac{dG}{dt} \right) / \rho_F - \frac{r \rho_L}{\rho_F} \frac{L^\alpha}{L^\alpha + H_1^\alpha} \frac{1}{1 + \left(\frac{L}{H_2} \right)^\beta} \quad (1)$$

$$\frac{dL}{dt} = p \left(EI - EE - \rho_G \frac{dG}{dt} \right) / \rho_L + r \frac{L^\alpha}{L^\alpha + H_1^\alpha} \frac{1}{1 + \left(\frac{L}{H_2} \right)^\beta} \quad (2)$$

the model can be made energy balanced. Adding this term makes the simplifying biological assumption that the gain in lean mass corresponds to a loss in adipose tissue to achieve energy balance. We acknowledge that this process is significantly more complicated and that stored adipose tissue is not used to generate lean tissue. Future models can be developed to more accurately model this process.

Changing this term would result primarily in a slight decrease in predicted fat mass levels over time with insignificant changes in predicted lean mass levels. Since the main analyses included in the original manuscript are based on the lean mass results, the results and conclusions of the manuscript are unchanged when the model is replaced with an energy balanced model.

The original article can be found online at <https://doi.org/10.1007/s00421-017-3787-6>.

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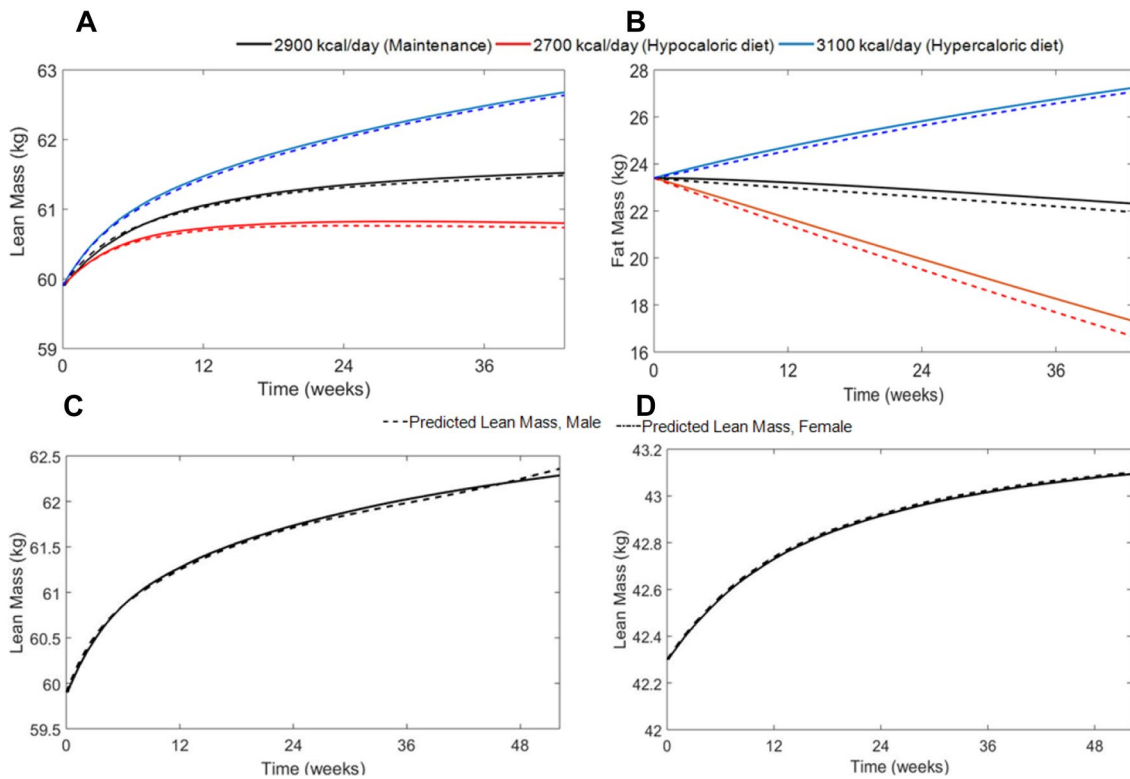


Fig. 1 Updated Fig. 3. Solid lines show predictions from the model of Torres et al. while dashed lines show predictions from the energy balanced model. **A** A comparison of predicted LM in response to RE for the same parameter set and varying energy in intakes: maintenance, a hypocaloric diet, and a hypercaloric diet. Initial body measurements used to generate simulations correspond to those of an aver-

age US male aged 20–39 years from NHANES 1999–2004 (Borrud et al. 2010). **B** Predicted FM is compared for the same conditions as in **A**. **C** Predicted LM in response to RE for the average US male on a maintenance energy intake (shown in **A**). **D** Predicted LM in response to RE for an average US female aged 20–39 years from NHANES 1999–2004 (Borrud et al. 2010)

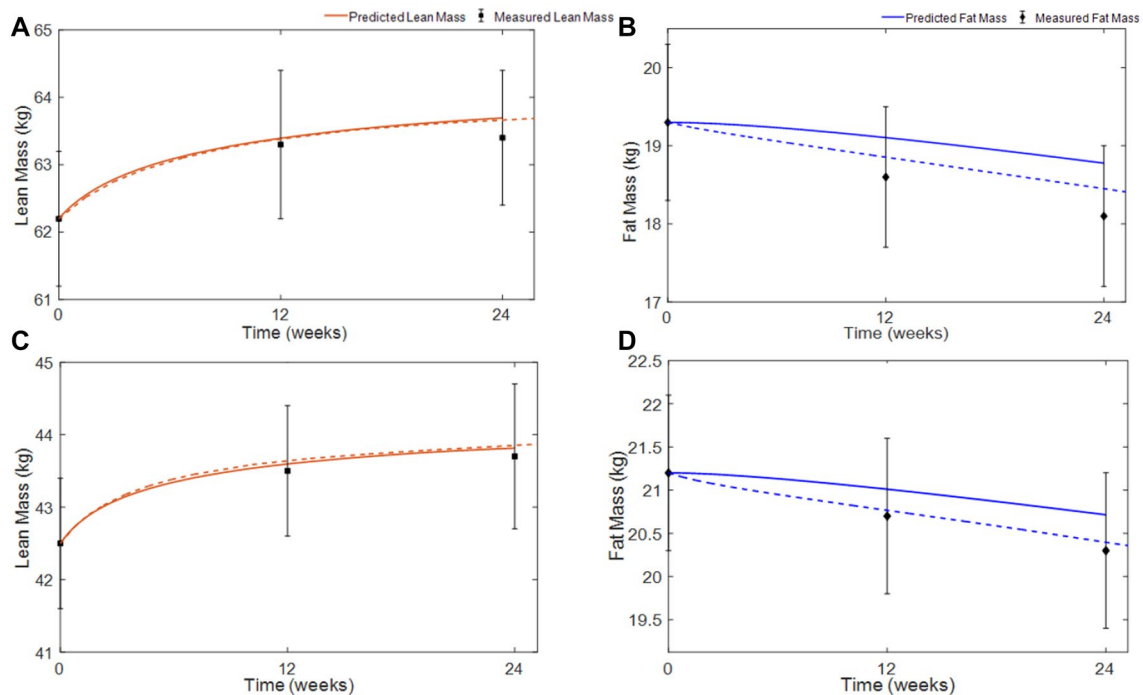


Fig. 2 Updated Fig. 9. Solid lines show predictions from the model of Torres et al. while dashed lines show predictions from the energy balanced model. Predicted and measured body mass during a trial comparing the effects of a moderate volume RE program on elderly men and women (Leenders et al. 2013). **A** Predicted and measured average

LM with SEM for 29 elderly men. **B** Predicted and measured average FM with SEM for 29 elderly men. **C** Predicted and measured average LM with SEM for 24 elderly women. **D** Predicted and measured average FM with SEM for 24 elderly women

The following two figures show typical differences in results between the model of Torres et al. and the energy balanced model under different initial conditions.

Page 452: Fig. 3.

Page 457: Fig. 9.

Us population, 1999–2004. Vital Health Stat Ser 11 Data Natl Health Surv 250:1–87
 Leenders M, Verdijk LB, van der Hoeven L, van Kranenburg J, Nilwik R, van Loon LJ (2013) Elderly men and women benefit equally from prolonged resistance-type exercise training. *J Gerontol Ser A Biol Sci Med Sci* 68(7):769–779

References

Borruud L, Flegel K, Looker A, Everhart J, Harris T, Shepherd J (2010) Body composition data for individuals 8 years of age and older: