

Some Excerpts From Recent Research on Metabolic Testing and Body Composition Analysis in Eating Disorders.

- Current research supports what we are doing.
- Current research universally argues that weight and BMI, which are today's standard, are woefully insufficient measures of the disease and recovery.
- They all suggest that Metabolic Testing and Body Composition Analysis are very helpful tools. None of the research suggests that this should be the main aspect of treatment (neither do we!).
- No existing research suggests that we should not be doing this.
- Please reach out to nick@thekahmclinic.com if you wish to read any of these papers – he will happily send copies to you.

Abbaspour et al., argue that “Specific measurement of body composition in patients with AN provides information critical to both the provider and patient throughout the duration of illness. Bodyweight and BMI alone are not sufficient to comprehensively design treatment in a clinical setting.”¹

Mattar et al., argue that, “In cases of severe malnutrition, body weight and/or BMI are not sensitive tools to determine the nutritional status. Trocki et al. showed that in adolescents with AN [Anorexia] changes in BMI do not correlate well with changes in body composition. Loss of lean dry mass can be compensated by extracellular fluid accumulation and thus cannot be accurately sensed by body weight or BMI measurement. Thus it is valuable that the treating team assess the nutritional status of an AN patient with a simple, inexpensive and clinically available method such as the BIA [Body Composition Analysis].”²

Bou Khali et al., demonstrate that the normal way that dietitians calculate how much to feed their eating disorder patients - through equations based on BMR [Resting metabolic rate] - are often very inaccurate. They compared actual BMR measurements with the calculated values: “Studies that evaluated REE [same as BMR, resting energy expenditure] predicting equations in patients with AN did not report satisfactory results, especially when using equations that do not include body composition parameters [14,15,36,49]. . . . Our findings show that the classical REE

¹ Abbaspour, A., Reed, K. K., Hübel, C., Bulik-Sullivan, E. C., Tang, Q., Bulik, C. M., & Carroll, I. M. (2021). Comparison of Dual-Energy X-ray Absorptiometry and Bioelectrical Impedance Analysis in the Assessment of Body Composition in Women with Anorexia Nervosa upon Admission and Discharge from an Inpatient Specialist Unit. *International journal of environmental research and public health*, 18(21), 11388.

² Lama Mattar, Nathalie Godart, Jean Claude Melchior, Bruno Falissard, Sami Kolta, Damien Ringuenet, Christine Vindreau, Clementine Nordon, Corinne Blanchet, Claude Pichard, Underweight patients with anorexia nervosa: Comparison of bioelectrical impedance analysis using five equations to dual X-ray absorptiometry, *Clinical Nutrition*, Volume 30, Issue 6, 2011, Pages 746-752; Trocki O., Theodoros M.T., Shepherd R.W. Lack of sensitivity of weight targets compared with body cell mass for determining recovery from malnutrition in adolescents with anorexia nervosa. *Int J Eat Disord*. 1998; 23: 169-176.

estimation in patients with AN based on age, height, weight, and sex misses an important aspect of REE variability: the metabolic profile differences of patients at different disease stages. Besides the finding that the AN subtype seems to be an important factor when developing nutrition rehabilitation strategies, our data indicate that AN duration should be taken into account when estimating REE in the absence of body composition measurements.”³

Nitsch et al., argue that tracking body composition is crucial to Eating Disorder recovery: “Body composition and FM [Fat Mass] distribution in relation to the type of dietary pattern are key elements to monitor during the rehabilitation process.”⁴

Popiotek et. al. argue that “BIA [Body Composition Analysis] parameters are more [than BMI] adequate for nutritional status and treatment assessment in AN.” It continues by stating, “all the considered BIA parameters are useful in the detection of the state of starvation.”⁵

Doe Reis et al., argue that beyond measuring the metabolic rate, it is also important to track changes in body composition, namely, changes in fat free mass and fat mass:

“In AN [Anorexia], resting metabolic rate (RMR) undergoes changes mainly due to the loss of muscle mass, which is one of its main determinants [16–18]. In addition, important reductions in RMR have been observed in AN [19]. Detection of changes in body composition by BIA [Body Composition Analysis] direct and indirect indices could provide important support for clinical monitoring and definition of the stage of the disease. The assessment of BIA [Body Composition Analysis] indirect indices should include those that take the patient’s constitution into account, such as the fat free mass index (FFMI) and fat mass index (FMI) in order to overcome BMI’s lack of sensitivity and its limitation in distinguishing which compartment is affected [20, 21]. RMR, due to its changes along AN recovery and to its relationship to FFM, may add to the evaluation of AN stages.”

“Despite its role in diagnostic definition, BMI does not indicate which body compartment is affected [15]. Although it is recognized that FFM and FM are deeply affected during the active phase of AN, they cannot be used for the purpose of comparing individuals, since they vary according to physical constitution. For this reason, other easily obtainable measures, including BIA direct measures and indirect parameters, should be sought to assess the stage of anorexia nervosa.”

³ Bou Khalil R, Sultan A, Seneque M, Richa S, Lefebvre P, Renard E, Courtet P, Maimoun L, Guillaume S. Clinical Correlates of Measured and Predicted Resting Energy Expenditure in Patients with Anorexia Nervosa: A Retrospective Cohort Study. *Nutrients*. 2022 Jun 30;14(13):2727.

⁴ Nitsch A, Mehler P. Medical maladies in eating disorders-there is still much work to be done. *J Eat Disord*. 2023 Jun 5;11(1):88.

⁵ Popiołek, J., Teter, M., Kozak, G., Powrózek, T., Mlak, R., Karakuła Juchnowicz, H., & Małecka-Massalska, T. (2019). Anthropometrical and Bioelectrical Impedance Analysis Parameters in Anorexia Nervosa Patients’ Nutritional Status Assessment. *Medicina*, 55(10), 671.

“Recovered AN patients need a better characterization, since BMI and weight normalization may not reflect recovery of body compartments, energy expenditure and physiological condition [15, 16, 26].”⁶

Hübel et al, in a large meta-analyses, discuss the importance and usefulness of tracking changes in body composition, namely fat free mass and fat mass:

“Our primary meta-analyses showed marked alterations in body composition traits in patients with AN before and after treatment.”

“Detailed measurement of body composition with simple methods, such as BIA[Body Composition Analysis] or DXA, which offers additional information on bone tissue, may help refine our understanding of the nature of AN and its diagnosis. Our meta-analyses showed that all body compartments were markedly altered in AN. Individuals with AN presented with 50% lower fat mass and prolonged recovery periods for fat-free mass and bone mineral content. The core implication of body composition differences are alterations in metabolism, growth, and development.”

Hübel et al., also argue that measuring Phase Angle, PA, which measures cellular integrity, is a very helpful way to distinguish recovery from sickness. We measure this too.

“PA demonstrated a good capacity for distinguishing ANact,[active anorexia] from ANrec[recovered anorexia] and from HI[healthy individuals].”

“In conclusion, we observed that one of these indexes, the phase angle can play an important role in the assessment of nutritional status in recovering anorexia nervosa.”⁷

Maïmoun et al., argue that measuring REE helps track not only the altered body composition, but also blood glucose secretion, bone density, growth, and fat secretion. These are important bodily changes affected by eating disorders.

“Moreover, we demonstrate for the first time that REE measured by calorimetry provides an accurate reflection of not only the altered body composition, but also the variations in bone

⁶ Dos Reis TO, de Magalhães Oliveira F, Kattah FM, Pena NF, Soares MMS, da Gama Torres HO. Body composition and energy expenditure in anorexia nervosa: preliminary data of outpatients with recovering and active disease. *J Eat Disord.* 2022 Nov 16;10(1):167.

⁷ Hübel C, Yilmaz Z, Schaumberg KE, Breithaupt L, Hunjan A, Horne E, García-González J, O'Reilly PF, Bulik CM, Breen G. Body composition in anorexia nervosa: Meta-analysis and meta-regression of cross-sectional and longitudinal studies. *Int J Eat Disord.* 2019 Nov;52(11):1205-1223.

remodelling, glucose homeostasis, adipose tissue-derived hormones and growth factor secretion.”⁸

⁸ Laurent Maïmoun, S. Guillaume, P. Lefebvre, P. Philibert, H. Bertet, et al.. Evidence of a link between resting energy expenditure and bone remodelling, glucose homeostasis and adipokine variations in adolescent girls with anorexia nervosa. *Osteoporosis International*, 2016, 27 (1), pp.135 - 146.