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Amit Gupta
Centre For Diabetes Care, Greater Noida, India

Rethinking Metabolic Health — Integrating Physical Activity and Body Composition in Diabetes Prevention and Management

The increasingly high global disease burden of type 2 diabetes (T2D) and insulin resistance (IR) compels the creation of effective strategies for prevention and management. The two studies of this issue of 'Clinical Diabetology' add thoughtful insights to the ongoing debate. Dubaj et al. [1] examine the contribution of daily step count to diabetes prevention and control, and Gołacki et al. [2] investigate the utility of bioimpedance body composition analysis in evaluating insulin resistance in women with overweight and obesity. Collectively, these articles present a strong case for a more subtle and personalized approach to metabolic health.

Small steps, big impact: physical activity and diabetes prevention

Dubaj et al. [1] describe a systematic review that shows how small daily step increases can provide significant metabolic health benefits. The research dispels the common 10,000-step daily recommendation, instead finding that an optimum of between 4500 and 9000 steps per day is needed for better glucose metabolism and T2D risk reduction. Notably, their research indicates that as few as 4000 steps a day provide tangible health benefits, highlighting the importance of setting realistic and achievable activity levels.

The molecular processes underlying these advantages are well established: enhanced insulin sensitivity, improved GLUT4 translocation, and improved lipid metabolism all serve to enhance glycemic control. Moreover, the review identifies that the mortality benefits of walking plateau after 9000 steps, further solidifying the principle that more is not always better. Clinically, this data supports a strategy of a gradual, incremental increase in daily physical activity over strict compliance with an arbitrary cutoff.

Beyond BMI: a new perspective on body composition and insulin resistance

Concurrently, Gołacki et al. [2] tackle a long-standing shortcoming in metabolic studies: the use of BMI and waist circumference (WC) as surrogates for metabolic risk. Their research assesses the utility of visceral fat rating (VFR) derived from bioimpedance body composition analysis in the prediction of insulin resistance. Although conventional markers like BMI and WC are still useful, they cannot distinguish between subcutaneous and visceral fat, the former of which is less linked to metabolic dysfunction.

The results of the study suggest that VFR can be used as a secondary biomarker for insulin resistance, especially in obese women. While bioimpedance is a cheap and non-invasive device, the study also recognizes the necessity for additional validation prior to its use in clinical settings. This study is especially well-timed, considering the increasing awareness of metabolic-associated steatotic liver disease (MASLD, previously NAFLD), a condition strongly associated

Address for correspondence:
Amit Gupta
Centre For Diabetes Care, G-9, Krishna Apra Plaza,
Alpha 1 Commercial Belt, 201308 Greater Noida, India
E-mail: dramitaol@gmail.com
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with visceral fat deposition and insulin resistance. An improved method of body composition measurement may improve early detection and directed intervention.

Towards a more comprehensive approach to metabolic health

Taken together, these findings support the use of personalized, evidence-based methods in the management of metabolic health. Dubaj et al. offer an understandable and usable guide to physical activity enhancement, and Gołacki et al. point toward the importance of more nuanced measures of obesity. The combination of both methods — promoting sustainable movement objectives with more detailed measures of metabolic risk — has the potential to enhance diabetes prevention and treatment.

Future studies need to further tailor these strategies by examining how step count interventions may be tailored to metabolic risk profiles and whether or not bioimpedance assessments can be made more standardizable for wider clinical application. Furthermore, longitudinal trials are required to determine the long-term effects of these interventions on diabetes progression and complications.

Conclusions

The research published in this volume of 'Clinical Diabetology' joins a developing set of literature recommending a move from one-size-fits-all suggestions for the prevention and management of diabetes. Stimulating step-by-step increases in daily physical activity and using more accurate body composition measures might provide the kind of patient-specific strategies that interventions would need to effectively address. As our definition of metabolic health continues to expand, so must our clinical practices, so that interventions are not only effective but also sustainable in everyday practice.

Conflict of interest

The author declare no conflict of interest.

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