

Breezing Pro™ 技术认证*

研究背景：了解全身代谢参数，如能量消耗，对体重管理^[1,2]和了解代谢健康很有价值。静息能量消耗（REE）占人体总能量消耗（TEE）的80%以上。在其他条件相同的情况下，如果基础代谢显著减少或增加，如果继续保持相同的热量摄入将分别导致体重增加或减少。REE的金标准评估是道格拉斯袋法（间接量热法的一种形式），这是一种昂贵且繁琐的程序，其中连续呼出的气体被收集在一个袋中，并通过符合行业标准的O₂和CO₂传感器检测器进行气体体积测量分析。Breezing Pro™提供了一种移动的、便携的，客户体验更好的方式进行代谢测试。

研究目的：本研究通过间接量热法，在实验室对比道格拉斯袋法和Breezing Pro™测定氧耗率（VO₂）、二氧化碳生成率（VCO₂）和REE的准确性。

研究结果：44名受试者在静息状态下用Breezing Pro™和Douglas-Bag法测定了VO₂、VCO₂和REE参数。图1（A-C）显示了两种测量的比较相关图，表明两种测量VO₂、VCO₂和REE的方法之间存在1:1的强相关性，均为p<0.0001，相关斜率接近1.00，平方相关系数（r²）接近0.9。此外，用Bland-Altman图还绘制了Breezing Pro™和Douglas-Bag方法与图2中两种方法的Douglas-Bag方法REE值之间的误差百分比差异。此图还显示Breezing Pro™和Douglas Bag方法之间的一致性，在1000-3000 kcal/天之间，95%的REE值的相对误差在±10%以内。

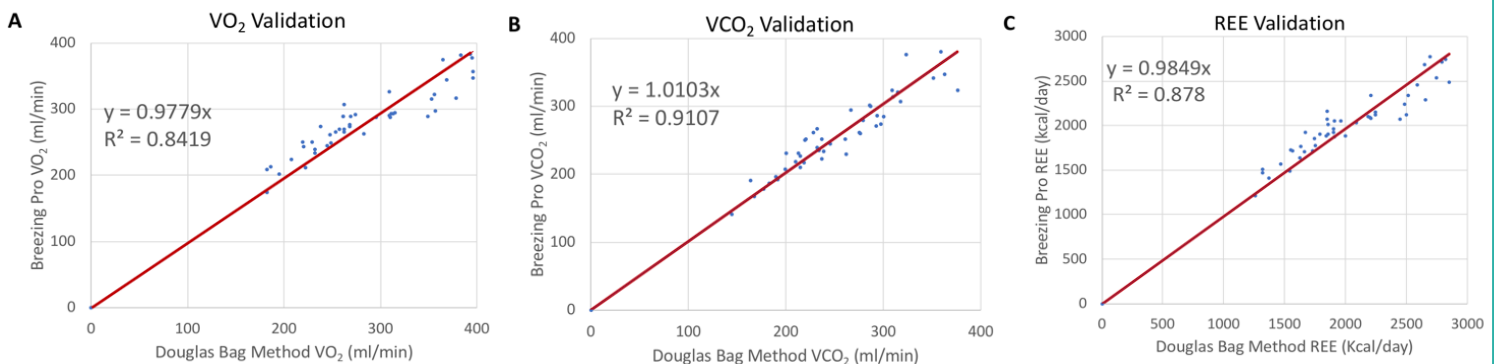


Figure 1: Correlations between Breezing Pro™ and the Douglas Bag Method for (A) VO₂ and (B) VCO₂, and (C) REE for 44 subjects

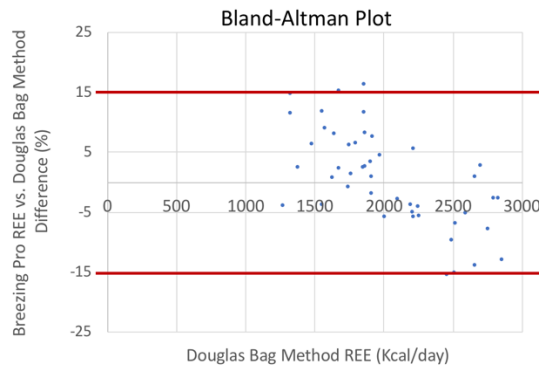


Figure 2: Bland-Altman plot of calculated REE from N = 44 unique subjects at resting conditions, differential percent error $\left(\frac{[REE \text{ (by Breezing Pro } ^{TM}) - REE \text{ (by Douglas Bag Method)}]}{REE \text{ (by Douglas Bag Method)}} \times 100 \right)$ between Breezing Pro TM and Douglas Bag Method

研究结论：Breezing ProTM测定V02和VC02，并从测定的V02和VC02中测定REE。测试结果与Douglas-Bag法一致性好，p<0.0001。这项研究证实了Breezing ProTM是一种精确的代谢参数跟踪设备，它有助于为患者提供代谢健康评估，并开发具有更好临床结果的健康管理程序。

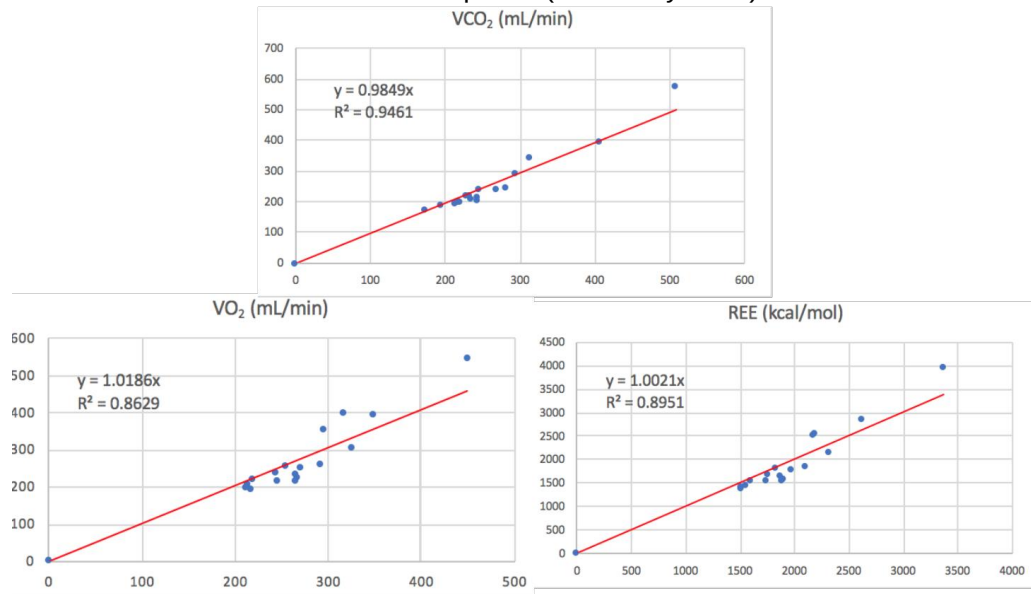
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References

- [1] W. D. McArdle, F. I. Katch, and V. L. Katch, "Exercise Physiology: Energy, Nutrition, & Human Performance," Lippincott Williams & Wilkins, 2007.
- [2] M. M. Manore, N. L. Meyer, and J. Thompson, "Sport Nutrition for Health and Performance," *Human Kinetics (Ed.)*, vol. Second Edition, 2009.

Breezing Pro™与能量代谢车对比测试实验

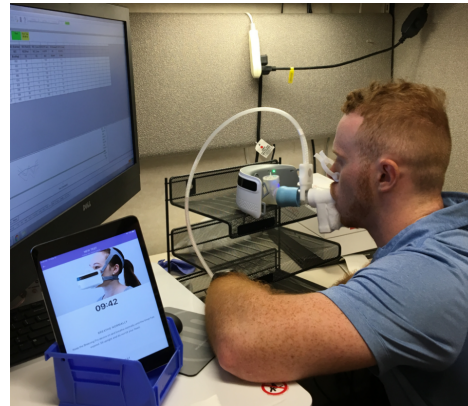
Validation Study: Wearable mask vs. Medical Graphics (Ultima system)



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Collaborations with Dr. Doina Kulick and Dr. Bruce Johnson, Mayo Clinic Arizona



Note: series connection of the Breezing Pro and Medical Graphics systems is important to warrantee same breathing conditions are tested.

分析验证结论：

- 1.Total of subjects tested: 90+ with Gold standard method and Breath-by-Breath reference metabolic cart.
- 2.The wearable device for VO₂, VCO₂, and Resting Energy Expenditure (EE) demonstrated between 90-100% accuracy with 95% confidence interval.