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# Validity of LivePod2 accelerometers in measuring energy expenditure of college students

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# Introduction

- Physical activity does benefit to our health.
- Physical Activity Guidelines give us what is scientific physical activity from the facet of intensity, time, and amounts etc.
- How to make physical activity more efficient and effective to our health? The accelerometer can help us to measure the amount of EE, the intensity of activity, and become popular objective measurement method.
- LivePod (Lp2) is a new accelerometer developed in China recently, but its accuracy in measuring energy expenditure (EE) has not been experimentally determined. The purpose of this study was to determine the validity of Lp2 in measuring EE in college students.



# About LivePod 2 (LP2)

- **What is it?** It is an accelerometer used to calculate energy expenditure during physical activity, just like ActiGraph GT3, Sensewear, RT3 etc.
- **How to work?** Acceleration transducer is the main unit of LP2, can be used to sense three-dimensioned acceleration. Smart Action Identify Model (SAIM) transforms the acceleration signal to a series of basic physical activities. For example, steps per minute. Another model of Individuation Energy Consume Mode (IEC) combines the gender, age, weight, and physical activity information, and calculate the EE during activity.
- **What are the function?** Recording and displaying the number of steps per minute, the total absolute EE and the data can be downloaded from website ([www.beingpower.net](http://www.beingpower.net))
- **How to do the workout with it?** During physical activity, you can pick it up in your pocket, on your hip, in your carry-on bag etc.







# Methods: Subjects

	n	age	height (cm)	weight (kg)
male	12	23.5±2.5	174.1±3.7	71.1±6.7
female	14	21.5±1.6	166.2±5.6	58.9±6.8
sum	26	22.4±2.2	169.8±6.2	64.5±9.1



## Methods: Process

At the start of testing the subject had an initial 10 min period of inactivity to collect baseline inactivity data, and then, they were asked to exercise in the following four conditions: Keeping 30 minutes continuous movement on a Mercury treadmill, walking 10 minutes at 4 kph, brisk walking 10 minutes at 6 kph, and running 10 minutes at 8 kph. Their EE during the exercises were measured by a MAX II system and compared with those estimated by Lp2.



## Methods: Data analyses

Data analyses included paired t-test for method difference and Pearson correlations for validity coefficient. Bland and Altman plots were also employed for visual examination.



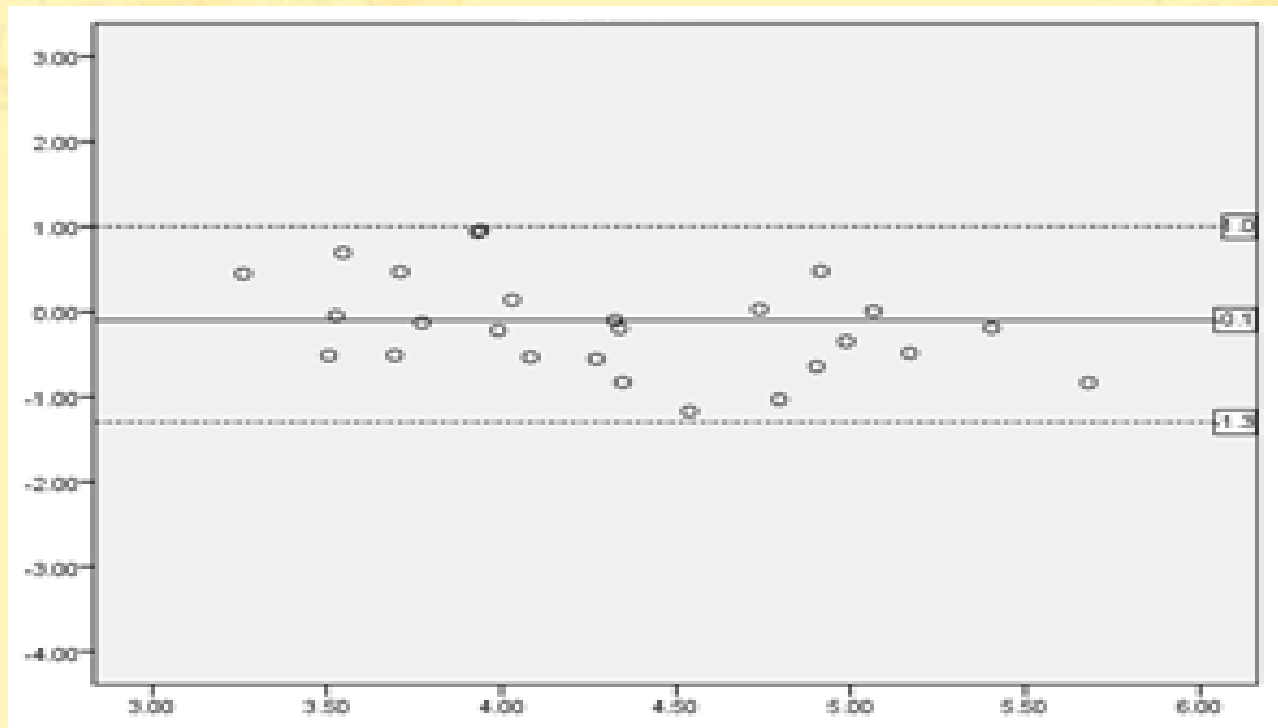
# Results

Speed	Mean (kcal min <sup>-1</sup> ) & 95% CI		Difference of means (kcal, MAXII-LP) & 95% CI	correlation coefficient
	MAXII	LP2		
4KPH	4.2(4.0,4.4)	4.4(4.0,4.7)	-0.1(-0.3,0.06)	0.71**
6KPH	5.6(5.3,6.0)	5.8(5.4,6.1)	-0.1(-0.3,0.1)	0.8**
8KPH	6.6(6.0,7.3)	8.0(7.4,8.6)	-1.(-1.,-0.9)	0.74**



# Bland and Altman 95% limits of agreement

Mean difference of MAXII and LP2



Mean of MAXII and LP2

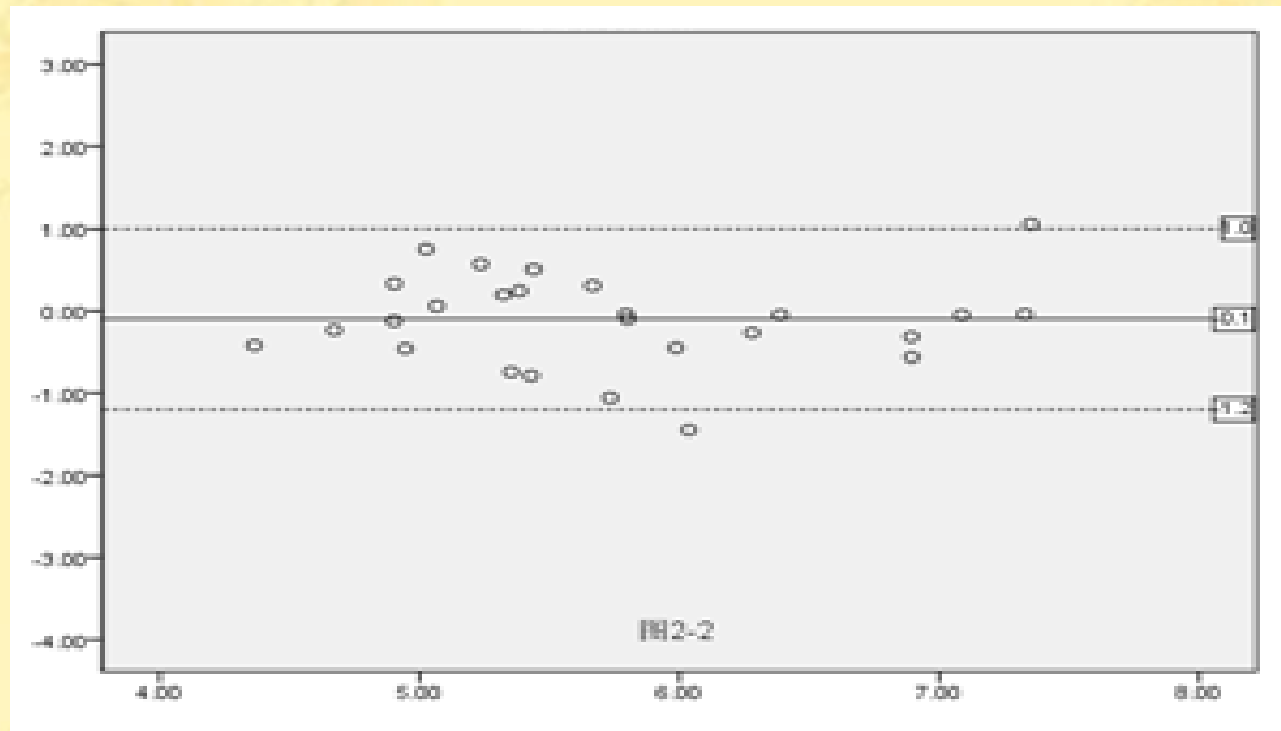
**4KPH: Bias=-0.1 ;CI (-1.3, 1)**





# Bland and Altman 95% limits of agreement

Mean difference of MAXII and LP2



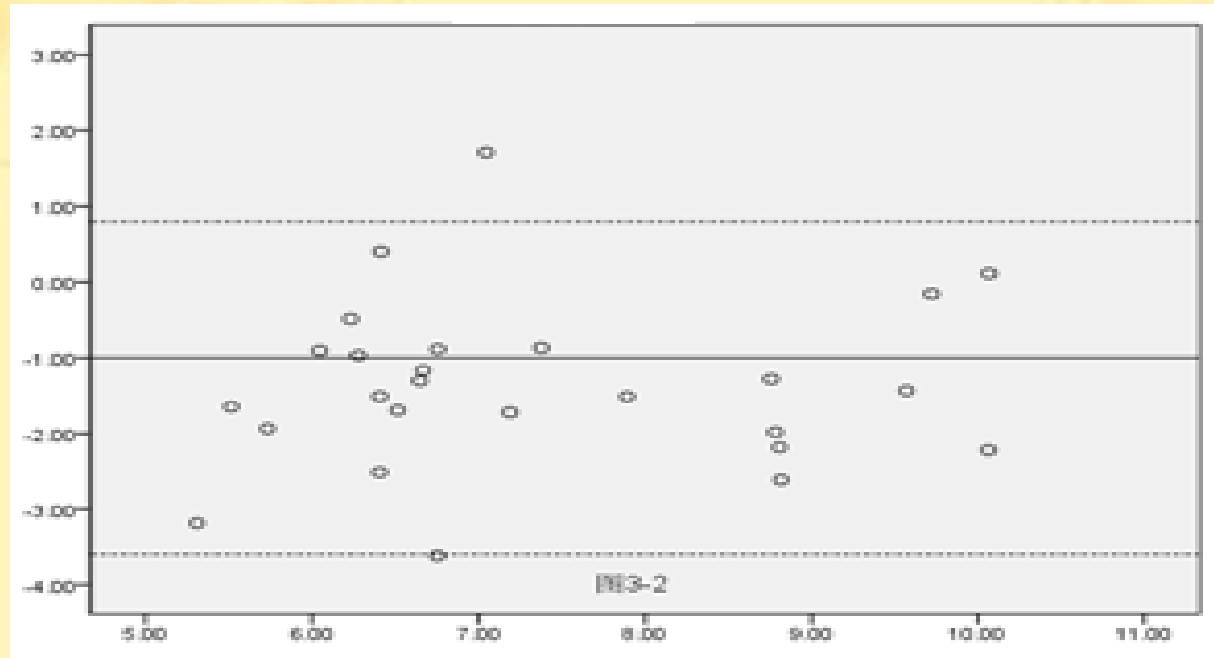
**6KPH: Bias=-0.1 ; CI (-1.2, 1)**

Mean of MAXII and LP2



# Bland and Altman 95% limits of agreement

Mean difference of MAXII and LP2



Mean of MAXII and LP2

**8KPH: Bias=-1 ; CI (-3.6, 0.8)**



# Conclusions

Lp2 could accurately estimate EE of college students in walking or running and its validity in these conditions is confirmed.



# Thanks!

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