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Agreement Study Between the ParvoMedics TrueOne 2400 and Vacu-Med Vista MINI-CPX Metabolic Measurement System

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Introduction

- Aerobic capacity (VO_{2MAX}) predicts both athletic performance and health status. Many tools are available to assess VO2 MAX ranging in both cost and accuracy.

- Understanding limitations of less expensive tools, likely found in settings such as health clinics or sports performance facilities, will help practitioners in developing accurate exercise prescriptions for their respective populations.

Purpose

To evaluate agreement lower cost VO_{2MAX} assessment tool (Vacu-Med Vista MINI-CPX) to the industry "gold standard" (ParvoMedics TrueOne 2400).

Methods

- Thirty-one participants (22.5 ± 3.5 years; BMI 24.9 ± 2.3; 51% female) completed two sessions of maximal VO_{2MAX} assessment using the Bruce Protocol graded treadmill exercise test.

- The first session of assessment utilized the "gold-standard" unit (TrueOne 2400, ParvoMedics, Inc., Murray, UT)..

-). 24-48 hours later the second unit (Vista Mini-CPX, Vacu-Med, Inc., Ventura, CA) was used to assess VO_{2MAX} again.

Statistical Analysis

- A Bland-Altman analyses was used to evaluate both potential bias and agreement for between the two assessment tools.

Results

- The CPX unit significantly overestimated VO_{2MAX} compared to the TrueOne (Bias = 10.67 ± 5.87 ml/kg/min, LoA = -0.83, 22.18; t = 1.96, p < .001).

- However, the CPX unit demonstrates good reliability as 93.5% (29/31 participants) of values fell within the 95% LoA.

- Further, values above 46.5 ml/kg/min tend to be greater than the mean bias while those below tend to be lower than the mean bias (r = .605, F = 16.80, p < .001).

TABLE 1. Participant Characteristics

	Age (year)	Sex	BMI	Fat Mass (kg)	Fat Free Mass (kg)
Participants (n=31)	22.939 ± 4.24	M=51.5% F=48.5%	24.96 ±4.11	22.77 ±11.08	53.65 ±13.31

TABLE 2. Regression Statistics

Regression Statistics	
Multiple R	0.605681505
R Square	0.366850085
Adjusted R Square	0.345017329
Standard Error	4.752696697
Observations	31

TABLE 3. ANOVA

ANOVA	df	SS	MS	F	Significance F
Regression	1	379.5423732	379.5424	16.80274	0.000305471
Residual	29	655.055651	22.58813		
Total	30	1034.598024			

Results

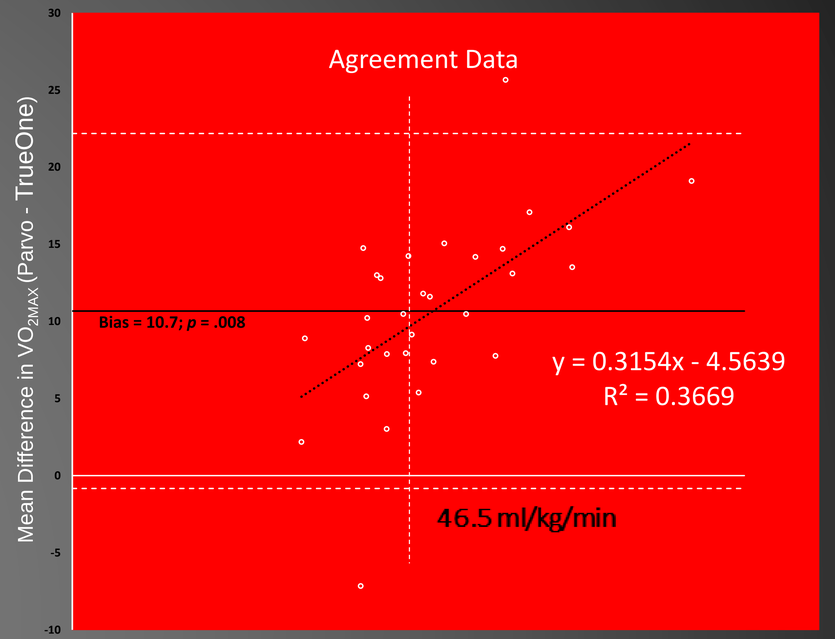

Figure 1. Agreement Data

Conclusion

- The CPX unit demonstrates good reliability yet a significant overestimation of aerobic capacity.

- The CPX is a tool that can be used for individuals that are less trained, more average individuals.

- For clinical populations the CPX is a good tool for assessing cardiopulmonary fitness.

- For trained athletes and individual that work out regularly, should use the Parvo Medics to assess aerobic capacity.

References

1. Accuracy and reliability of the ParvoMedics TrueOne 2400 and MedGraphics VO2000 metabolic systems. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=validation+for+ParvoMedics+TrueOne+2400&btnG=#d=gs_cit&u=%2Fscholar%3Fq%3Dinfo%3A1ahoIKfNSEoJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26hl%3Den