Heart Rate as an Isolated Fitness Indicator: is it time to eradicate Age and Gender Considerations in the Burn Injury Patient Demographic?

The Steady State Cycle Test

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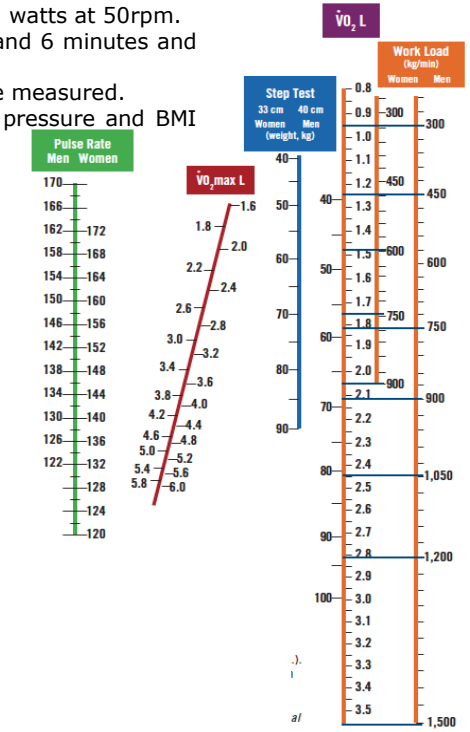
Introduction:
This pilot, cross-sectional, observational study seeks to validate a steady state cycle test (SSCT) in a healthy adult population through comparison of maximum heart rate (HR) attained, percentage increase of HR and subsequent time to recovery (baseline HR) to maximum aerobic capacity (VO_2 max) calculated from the Astrand-Rhyming Cycle Ergometer Test (ARCET)[1,2]. If the SSCT is validated, it is for secondary trial in the burn injury patient demographic.

The Test:
- Cycling for 6 minutes at 75 watts at 50rpm.
- Heart rate measured at 5 and 6 minutes and averaged.
- Time to recovery heart rate measured.
- Baseline heart rate, blood pressure and BMI recorded.

The Comparator
ARCET:
6 minutes of cycling at intensity (selected by gender and conditioning) to achieve a heart rate between 120-170bpm to calculate maximum aerobic capacity (VO_2 max)[3,4] using the pictured normogram[5].

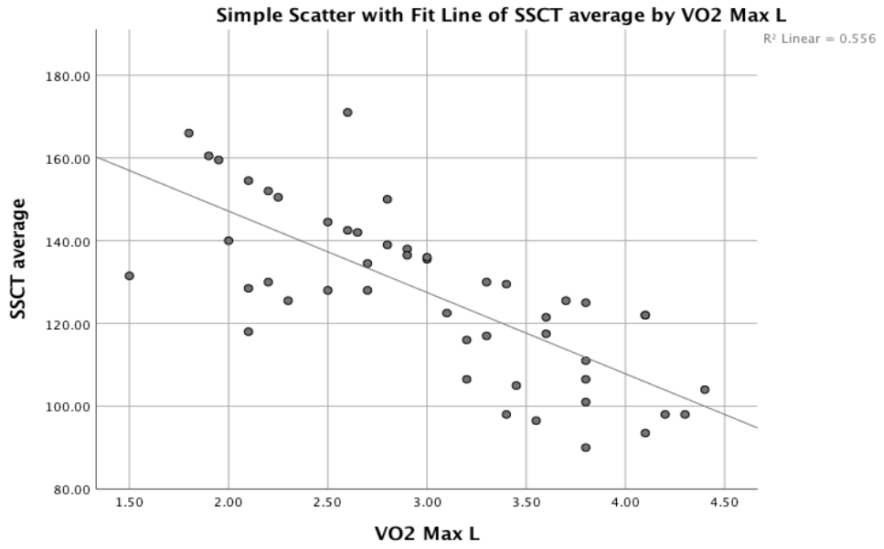


V̇O2MAX CORRECTION FACTORS	
Age	Correction Factor
15	1.10
25	1.00
35	0.87
40	0.83
45	0.78
50	0.75
55	0.71
60	0.68
65	0.65

Thankyous:
Ethics approved by South Metropolitan Health Service Human Research Ethics Committee.
Testing undertaken at the (1) State Burns Unit of Western Australia, Fiona Stanley Hospital.

Preliminary Results:
N= 51/74 complete

VO_2 Max Relationships	Correlation	Effect Size	Coefficient	P-value
SSCT Maximum HR	-0.746	0.556	-0.028	0.000**
% Increase HR	-0.314	0.099	-0.871	0.030*
Time to Recovery	-0.439	0.193	-0.165	0.004*
	Significant*, Highly significant**			



Why the SSCT?
- Minimal submaximal effort required.
- Similar to peri-operative status quo physiotherapy.
- Easily administered.
- Easy to interpret.
- Easy to understand.

Planned Result:
To create an easy to interpret table/graph to attribute a fitness score to participants following completion of the SSCT, utilizing their maximum HR, HR percentage increase and subsequent time to recovery to correlate to an approximate VO_2 max figure.

Conclusion:
Preliminary results show the SSCT's maximum HR and percentage increase in HR have strong correlation and are a good predictor of VO_2 max in the heathy population.

References:
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