

Maximal oxygen uptake - prediction from submaximal tests

Maximal oxygen uptake ($\text{VO}_2 \text{ max}$) has been recognized as the best index of cardio-respiratory fitness. In Sri Lanka, the Astrand nomogram has been used in several studies to determine $\text{VO}_2 \text{ max}$. In the present study, $\text{VO}_2 \text{ max}$ is predicted by extrapolation from the subject's own responses to graded submaximal exercise.

The subjects comprised 13 sedentary, male volunteers with a mean age of 25.1 years (SD 2.7). Each subject exercised on a treadmill at 4 graded speeds. The steady state heart rate and oxygen uptake was determined for each speed using standard techniques. The heart rate/oxygen uptake relationship was extrapolated to the subject's predicted maximum heart rate to determine $\text{VO}_2 \text{ max}$.

The mean \pm SD for $\text{VO}_2 \text{ max}$ was found to be $35.8 \pm 7.4 \text{ ml kg}^{-1} \text{ min}^{-1}$. This is not significantly different ($p > 0.1$) from values obtained for similar subjects using the Astrand nomogram. Both values are below the reference range for average fitness in Swedish subjects.

The correlation of oxygen uptake with heart rate and speed were highly significant ($r = 0.998$, $p < 0.001$ for both). The slopes of the lines denoting these relationships can be used for exercise prescription and for monitoring cardio-respiratory fitness and training in 3 individual subjects.