Pulmonary Mechanics and Gas Exchange during Exercise in Kenyan Distance Runners.

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Abstract

PURPOSE:
The purpose of this study was to determine arterial blood gases, the mechanical limits for generating expiratory flow and the work performed by the respiratory muscles during treadmill exercise in Kenyan runners.

METHODS:
Kenyan runners (10M, 4F; 25.2±1.3 yrs) were instrumented with a radial artery catheter; an esophageal balloon-tipped catheter and esophageal temperature probe for determination of blood gases, the work of breathing and core temperature, respectively. Testing occurred at 1,545m above sea level.

RESULTS:
There were significant decreases in the arterial partial pressure of O2 and oxyhemoglobin saturation and a widening of the alveolar-to-arterial difference in O2 from rest to peak exercise. The mechanical work of breathing increased with increasing minute ventilation and was commensurate with values expected for treadmill running in elite athletes. During heavy exercise, significant expiratory flow limitation was present in half of the subjects while the remaining subjects demonstrated impending flow limitation.

CONCLUSIONS:
Pulmonary system limitations were present in Kenyan runners in the form of exercise-induced arterial hypoxemia, expiratory flow limitation and high levels of respiratory muscle work. It appears that Kenyan runners do not posses a pulmonary system that confers a physiological advantage.