

Occasional piece

Heart rate of a rhinoceros running a marathon

Background

On a particular Sunday in April every year, the fair city of London is festooned with 30 000 runners, a good proportion of whom are decked out in all sorts of regalia and



Figure 1 Athlete in full rhino costume.

weird costumes. With the prime intention of bringing attention to themselves to promote their individual charities, many of these put themselves through a fair degree of physical and mental stress in order to complete the 26 miles 385 yards that is the London marathon.

One particular group of competitors put themselves through the most extreme conditions by wearing a 16 kg rhino suit (fig 1) to raise funds for the Save the Rhino charity.

As part of a medical research group interested in cardiovascular loading and adaptation during exercise and activity in the active and sedentary population, we wished to ascertain what sort of physiological stresses are placed on the body during such events run in alternative attire.

Other studies have reported that runners with lower energy costs, at a given velocity, have a metabolic advantage,¹ so what happens when this is deliberately reversed?

Method

A 24 year old woman who had run the 1998 London marathon in three hours and 20 minutes volunteered to be our subject. She was going to run the 1999 London marathon in a rhino costume.

A Polar Electro (Kempele, Finland) heart rate monitor, attached with a chest strap and using a wrist receiver, was used to ascertain her heart rate for the duration of the race. This method has been previously validated.² Before the event, baseline measurements were obtained to evaluate how much extra stress the costume placed upon her heart rate. In addition, we obtained a profile of the course which would allow us to compare changes in heart rate with the changing undulations of the course.

Result

The subject's resting heart rate was 52 beats/min. The baseline measurements for a comparable run, a half-

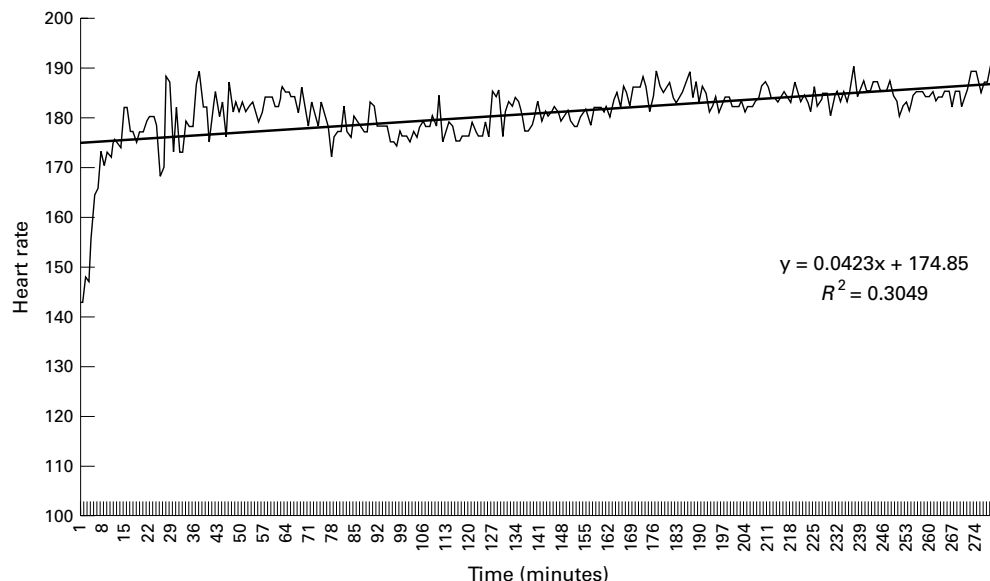


Figure 2 Plot showing heart rate of rhino runner for the duration of the 1999 London marathon.

marathon, gave an average heart rate of 159 beats/min. Figure 2 shows graphically the subject's heart rate for the duration of the London marathon in the rhino costume. On the start line, in anticipation of the race, it was 148 beats/min, then as soon as the race commenced, it was kept remarkably constant, fluctuating between a low of 168 and a peak of 191 beats/min.

The total number of heart beats during the race was 49 956 with an average rate of 181 beats/min.

Discussion

Anticipating that heat and fluid loss would be the biggest problem to confront our "rhino", the subject trained appropriately for the race by incorporating heat adaptation sessions which involved running in heavy clothing in warm conditions. Maintaining an adequate fluid intake for the duration of the training programme was viewed as essential. In summary therefore, she was well prepared for the demands of the event.

We were, however, a little surprised when we received the results of the run. To maintain an average heart rate of 181 beats/min for four hours and 35 minutes was remarkable. The subject's blood pressure was as baseline at the

completion of the race. She commented that at no time during the run did she feel overly stressed and, apart from heavy legs after 23 miles, finished in good spirits.

Conclusion

This brief investigation has supported other studies³ showing that young fit individuals can maintain high heart rates for long periods of time with little apparent stress or long term adverse effects. More importantly, it confirms that these types of activities should only be undertaken with adequate preparation, bearing in mind the physiological stresses placed on the body.

Coincidentally the subject broke the rhino record, running the fastest time ever in such a costume!

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- 2 O'Toole ML, Hiller WD, Douglas PS. Use of heart rate monitors by endurance athletes. *J Sport Med Phys Fitness* 1998;38:181-7.
- 3 Douglas PS, O'Toole ML, Hiller WD, et al. Cardiac fatigue after prolonged exercise. *Med Sci Sport Exerc* 1987;76:1206-13.