

ENERGY COST OF RIDING

By Johanna Harris

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Everyone wants to know - how hard is horseback riding? Is riding a horse as taxing as riding a surfboard or skateboard? Do we use as much energy riding and cleaning stalls as playing tennis and mowing the lawn? Well, it depends. We can make the energy cost, or energy demand, of riding as high or low as we want to a certain extent.

All good discussions about energy begin with food. The energy you need to groom, ride, and clean stalls comes from food and it's right there on the box - 350 calories per serving. The caloric content, or energy value, of food is determined by measuring the amount of heat generated when it's burned in a calorimeter. Each kilocalorie, or calorie, equals the amount of energy needed to raise the temperature of a kilogram of water by one degree Celsius.

Determining the energy expenditure of athletes is not easy in equestrian sports, nor is it easy in most other sports. Polo players do expend more energy than trail riders do, but competitive cyclists expend more energy than recreational cyclists and steep hills demand more energy than slight hills. When you think about the differences caused in energy expenditure by tire characteristics, snow conditions, water currents, and court surfaces, you see that most athletes are all in the same game. The energy demands of a sport constantly change according to the nature of the event, skill and motivation of the athlete, environmental conditions, and characteristics of equipment being used. It's just that for us, the horse's level of training and state of mind are also important factors.

Even if we forget about the fact the energy demands of a sport are constantly changing, it's still hard to determine how much energy an athlete has to expend. It's hard because there is no easy way to measure the amount of heat the body generates during an activity - the most direct method of measuring energy. So instead, we resort to a less direct method, one that measures energy expenditure by calculating the amount of oxygen an athlete uses during an activity. This works because the body uses oxygen at a fairly constant rate to convert the food that's eaten into usable energy (it takes roughly one liter of oxygen to burn five calories.).

Now that we know that there's a relationship between calories consumed and oxygen used, we can look at the calories an athlete burns during an activity and estimate its energy demands. The energy demands of horseback riding, as well as other physical activities, can be easily classified according to the number of METs or Metabolic EquivalentT required. A physical activity that is 6 METS requires that an athlete use six times more oxygen for energy than when he/she is resting quietly.

Using the chart below you can see how much physical exertion is required for an activity of a certain MET level:

METs Physical Exertion

< 3 METs = Mild

< 6 METs = Moderate

< 8 METs = Optimal

<10 METs = Strenuous

< 12 METs = Maximal

< 12 METs = Exhausting

Using a caloric expenditure chart and the results of a 1983 European study of elite and advanced riders, I put together the chart below. From this, you can see that equestrians never venture beyond optimal physical exertion.

Calories burned and METs used by an average 150-pound (68-kilogram) person during various activities:

Activity	Cal/Hr	MET
Clean Stalls	550	7.7
Feed horses	306	4.3
Groom	525	7.3
At the halt	78	1.0
Walk	168	2.3
Post trot	420	5.9
Sitting trot	450	6.3
Canter	514	7.2
Gallop	558	7.8
Paint fences	140	1.9
Drive tractor	150	2.1
Walk in field	335	4.7
Aerobics, slow	420	5.9
Shovel snow	450	6.3
Mow lawn	457	6.4
Jog, slow	550	7.7

The European study also found that:

1. The sitting trot was more demanding than the posting trot.
2. Experienced riders used 60 to 90% of their maximal oxygen consumption (or VO₂max*) while trotting and cantering.
3. Elite riders only used 38 to 58% of their VO₂max while trotting and cantering.
4. Two riders jumped a course of 10 jumps in less than one minute and used 73 and 78% of their VO₂max.
5. One experienced rider rode a 10-minute, upper-level dressage test and used 40% of his VO₂max.

*VO₂ max is expressed as the number of liters of oxygen consumed per kilogram of body weight per minute.

(Westerling, D. (1983) A study of Physical Demands in Riding, European Journal of Applied Physiology. 50:373-382

METs classified according to the amount of effort required.

The only problem is that the amount of energy you use to catch "Sunny", tack him up, and gallop off into the sunset is a very personal figure. It depends on your body weight, the smoothness and efficiency of your movements, how hard you work to control his movements, and, of course, what you're doing at the time. Heavy-set equestrians burn more energy catching their horses than slender equestrians do; novices expend more energy balancing themselves at the sitting trot than Olympians; trainers expend more energy cantering green horses than nonchalant pleasure riders on well-schooled mounts; and, quick-maneuvering polo players expend more energy than sight-seeing trail riders. But even with this personal stuff aside, we can still come close to determining the energy costs of riding by using a caloric expenditure chart and making adjustments for body weight (see chart).

To find how many calories you burn, add 10% for every 15 pounds over 150 pounds or subtract 10% for every 15 pounds you weigh less than 150 pounds (add or subtract 10% for every 6.8 kilograms you weigh under or over 68 kilograms). For example, a 135-pound woman burns roughly 405 calories an hour at the sitting trot [$450 - (450 \times .10) = 405$].

So exactly how hard is it to ride and take care of horses? After all of this, we can still say that it depends. And surfers and skateboarders can say the same thing. But, we can also say that the energy we expend is rarely more than an optimal amount. Perhaps that is why so many people enjoy horseback riding.

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