Activity monitoring: technology fad or valuable clinical tool?

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Made for dogs

Myra Forster-van Hijfte offers her thoughts on a new possibility in canine veterinary care, and suggests ways vets could embrace this emerging trend for the benefit of dogs and their owners.

The use of wearable activity monitors has seen a dramatic growth in the human sector in the past few years. Fitbit alone has more than 25 million active users (www.fitbit.com), and a glance at the wrists of friends and colleagues shows a variety of similar products are available.

The market is maturing – and these products are here to stay.

Activity monitors provide objective data about their wearers' activities, which can be useful in several ways. Humans have a tendency either to not know their level of activity, or overestimate how active they have been. In one study, patients self-reported 366% higher levels of physical activity compared to objective measurements[1].

Meanwhile, goal-setting acts to encourage activity – knowing you have almost reached your 10,000 steps per day goal makes you walk that extra bit.

It is clear the availability of this technology is transforming awareness of our own fitness.

Following in the footsteps of the human market, affordable and accurate canine activity monitors are now available in the veterinary market. Like their human equivalents, these are based on "triaxial accelerometry" – the devices sense how a dog moves in three dimensions and process that data, through validated algorithms, to provide a higher-level analysis of the dog's activity patterns.

Dog owners are buying and using these products, and this raises a question for vets: how can we use canine activity monitoring in clinical practice?

The answers are surprisingly varied, and include preventive health care, weight management, response to treatment, rehabilitation, early detection of conditions, and research-oriented uses.

Preventive health care

In human medicine, physical activity has been shown to provide physiological benefits, as well as a general sense of well-being and reduction in anxiety. It is an important part of staying healthy for humans, and is thought to be similarly important for dogs.

It is difficult to assess a dog's quality of life objectively, as such assessments are usually based on an owner's observations. However, one study with a limited number of dogs looked at how the level of endocannabinoids – believed to be one of the substances responsible for the positive effects of exercise – increased both in humans and dogs after 30 minutes of running, and postulated that dogs also experience the same positive effects after more strenuous exercise[2].

As vets, we are used to explaining the benefits of exercise to dog owners, just as doctors have explained the same to their human patients for decades. It is, therefore, reasonable to assume encouraging dog owners to acquire and use canine activity monitors could well replicate the beneficial effects of these products already experienced in the human market.

Activity goals and feedback from the devices should encourage owners to properly exercise their dog, and keep doing so over the long term.

Providing the dog with an activity monitor could also give vets objective data regarding the dog's activity. This data is a useful tool in estimating the dog's daily total energy expenditure, which, in turn, allows a more tailored feeding of each dog, thus helping the dog maintain a healthy bodyweight and condition score.

Using activity monitoring this way will, ultimately, result in a physically active dog in good body condition, which is important in preventive health care, and fits well within the setup of a wellness clinic in the practice. As well as offering objective data, the presence of the activity monitor offers an additional positive interaction between the owner and veterinary surgeon during any wellness consultation.

Weight management

In the BVA and BVNA surveys of 2017, veterinary surgeons and nurses in the UK estimated 46% of the dogs they saw in their practices were overweight or obese (mean value), and 40% of the vets and nurses thought the number of obese dogs had increased in the two years prior to the survey[3].

Of course, a complex relationship exists between movement and energy expenditure, which needs to take multiple variables – such as age and body mass – into account. However, a more active lifestyle – that includes more walking – is one factor associated with successful weight loss in humans[4]. In one study in overweight dogs, one group was put on diet-only treatment, while another had a fitness-and-diet treatment. Lean body mass was preserved during weight loss in the fitness-and-diet group, but not in the diet-alone group – implying a similar positive contribution of physical activity[5].

Weight management (continued)

Although increasing physical activity may only contribute a small amount to weight loss, it does give owners a positive action (increasing exercise) rather than just a negative action (reducing food intake), which may help with overall compliance with a weight loss programme and help maintain weight after the target has been achieved.

Monitoring response to treatment

Monitoring response to treatment is a very active field in human medicine, where research into the suitability of treatment uses an increase in physical activity as a positive indicator of therapeutic effectiveness.

We can expect to see the same effect in animals – indeed, research in the veterinary field has been done using an activity monitor to show an improvement in activity when dogs with arthritis have been treated with NSAIDs[6].

The added benefit here is owners of such a monitored dog will also receive a clear indication of any decline in activity if medication is discontinued, which, in turn, can be expected to significantly help with owner compliance regarding continuing medication.

Rehabilitation

While monitoring looks at how activity levels indicate response to another treatment, in rehabilitation managed activity is often prescribed as an aid to postoperative treatment.

Step count feedback in humans with total hip or knee replacements has already been shown to improve activity levels[7]. In humans, the devices have also been used for rehabilitation in congestive heart failure[8 9] and post-acute coronary syndrome[10], where regular physical activity has shown a reduction in mortality and hospital readmissions.

At the same time – again, in the human world – increased physical activity before surgery has been shown to reduce duration of hospitalisation, and give an improvement in postoperative status, in patients undergoing cancer surgery[11 12], and in the outcome of patients with chronic obstructive pulmonary disease, congestive heart failure and chronic renal disease[13 14 15].

Similarly, by using a canine activity monitor, dog owners can be set objective goals in rehabilitation. This may be particularly useful in orthopaedic and neurosurgical cases, while also revealing response to surgery rather than relying solely on subjective owner observation.

Changes in activity

It is reasonable to believe changes in canine activity patterns may act as indicators of underlying health changes. A decline in activity may be a normal effect of ageing, but it may also be a useful prompt to check for an underlying cause – for example, signs of arthritis and reduced cardiac output.

Data collected by an activity monitor can be reviewed continually by the owner and veterinary surgeon during an annual health check, again offering a good reason to encourage owners to use these devices.

Research tool

The use of activity monitoring in research is evolving at a fast pace as the monitors become more accurate and affordable.

Activity monitoring provides veterinary surgeons with objective data regarding the dog's activity. In trials, it can be used to monitor response to treatment through activity changes, standardise exercise during a clinical trial, and provide valuable data in observational studies looking at epidemiology, screening and genetics.

Which monitor?

The activity monitors market is diverse, so when choosing a device for your practice it is important to bear in mind the following criteria:

- Has the activity monitor and its algorithms been designed specifically for dogs and with veterinary input, or is it a rebadged human device that won't work as well?
- Is the device, and any app it uses, easy for every dog owner to understand and be happy to keep using over the long term, or will the owner quickly become confused and/or bored?
- Does the device have a long battery life so the dog can wear it continuously, or will it need frequent charging – resulting in loss of data when the dog is not wearing it, or when the owner is forgetting to put it back on the dog?
- Is the device affordable, so as many dogs as possible can benefit?

Just like its human counterpart, canine activity monitoring is an exciting add-on to veterinary practice, and provides vets, VNs and owners with new and promising opportunities for improving the care of our patients.

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See website link below for the original article and links to references:
https://www.vettimes.co.uk/article/activity-monitoring-technology-fad-or-valuable-clinical-tool/