

Four Leg Rehab

NEWSLETTER



Exercise Tidbits & Research – Part 2

Hi Folks!

So, just as I promised, this issue is more about exercise, and in particular I wanted to pass along some literature reviews that I thought were interesting and relevant to the practice of canine rehab. We start with humans and then move on to what I could find

regarding dogs. It's hard to find exactly the kind of research that you or I would care about (as it pertains to canine physiotherapy & rehab) that is dog-specific... So here are a few snippets!

Cheers!

Laurie

Human Exercise Prescriptions

- General Population
- Older Adults

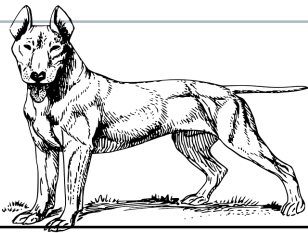
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Determining Fitness Level in Dogs!

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Use of Accelerometry in Dogs!

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Exercise Recommendations... from the American College of Sports Medicine (human)

Belter JG, Carey HV, Garland T Jr. Effects of voluntary exercise and genetic selection for high activity levels on HSP72 expression in house mice. *J Appl Physiol.* 2004; 96(4):1270-6.

New evidence also suggests that some of the adaptive responses to exercise training are genotype-sensitive, at least in animal studies.

General



Older Adults

Garber CE, Blissmer B, Deschenes MR, et al. Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise. *Medicine & Science in Sports & Exercise: July 2011 - Volume 43 - Issue 7 - pp 1334-1359.*

All healthy adults aged 18 to 65 years need moderate-intensity aerobic physical activity for a minimum of 30 minutes 5 days / wk, or vigorous activity for a minimum of 20 minutes 3 days / wk. – Emphasis that lower intensities have some health benefits, but that greater benefits can be

gained with higher intensities – Older adults and clinical populations – typically low-moderate intensity

Every adult should perform activities that maintain or increase muscular strength and endurance a minimum of 2 days each week.

Chodzko-Zajko WJ, Proctor DN, Fiatarone Singh, Maria A, et al. Exercise and Physical Activity for Older Adults. *Medicine & Science in Sports & Exercise: July 2009 - Volume 41 - Issue 7 - pp 1510-1530.*

Exercise prescription for older adults should include aerobic exercise, muscle-strengthening exercises, and flexibility exercise.

Aerobic Exercise Training:

Three or more months of moderate-intensity Aerobic Exercise Training elicits cardiovascular adaptations in healthy middle-aged and

older adults, which are evident at rest and in response to acute dynamic exercise.

Resistance Exercise Training:

Older adults can substantially increase their strength after Resistance Exercise Training.

Balance Training:

Multimodal exercise, usually including strength and balance exercises, and tai chi have been shown to be effective in reducing the risk of noninjurious and sometimes injurious falls in populations who are at an elevated risk of falling.

Flexibility Training:

There is some evidence that flexibility can be increased in the major joints by ROM exercises; however, how much and what types of ROM exercises are most effective have not been established.

Conclusion:

Several evidence-based conclusions can be drawn relative to exercise and physical activity in the older adult population:

1) A combination of AET and RET activities seems to

be more effective than either form of training alone.

2) Exercise programs do not need to be of high intensity to reduce the risks of developing chronic cardiovascular and metabolic disease, however. However, higher-intensity exercise can be more effective.

3) Exercise benefits/effects are relatively short-lived, and the chronic adaptations to repeated sessions of exercise are quickly lost upon cessation of

training, even in regularly active older adults.

4) The extent to which exercise can reverse age-associated physiological deterioration may depend, in part, on the hormonal status and age at which a specific intervention is initiated.

5) Exercise prescription for older adults should include aerobic exercise, muscle-strengthening exercises, and flexibility exercises. Additionally, specific exercises to improve balance may also be warranted.

Determining Fitness Level – in Dogs!

Swimmer RA, Rozanski EA. Evaluation of the 6 minute walk test (6MWT) in pet dogs. J Vet Intern Med. 2011 March; 25(2): 405–406.

69 healthy dogs & 6 dogs with cardiopulmonary disease took part. Physical characteristics of the dogs, including age, leg length, body condition score and weight were recorded

Test: Dogs walked for 6 minutes in a hallway and the distance covered was measured.

Healthy dogs walked 522.7 ± 52.4 meters, while sick dogs ($n=6$) walked 384.8 ± 41.0 meters ($P < 0.001$). There was low ($r=0.13$) to moderate ($r=0.27$) correlation in the healthy dogs between physical characteristics and distances walked.

Boddy KN, Roche BM, Schwartz DS et al. Evaluation of the six-minute walk test in dogs. Am J Vet Res. 2004 Mar; 65(3): 311–313.

16 young mature male hound-crossbred dogs. Test: Hallway walking. Dog set its own pace. Heart rate was recorded and mean systemic arterial pressure

Dogs with CHF had a significant increase in resting HR, significant decrease in MAP, and a significant decrease in the distance walked in 6 minutes. The MAP increased slightly after exercise during the control period but decreased slightly after exercise during the CHF period. Fractional shortening decreased significantly when dogs had CHF.

Use of Accelerometry – in Dogs!

It is difficult to find studies that relate to fitness testing in dogs. Accelerometry may be one method of determining the amount of activity in which a dog engages.

Current studies have looked at the validity of using accelerometry with dogs. Yam et al (2011) studied 30 dogs over a one-day period, and compared the synchronized video taped daily activity log with the accelerometer readings. They then studied 20 dogs over a 7-day period. They found that accelerometry output differed significantly between activity intensities (sedentary behaviour, light intensity physical activity indoors, light to moderate intensity physical activity outdoors and vigorous physical activity outdoors). With extended use, the scientists found the reliability to be over 90%, and concluded that accelerometer is valid, practical and reliable for the measurement of habitual physical activity

in dogs.

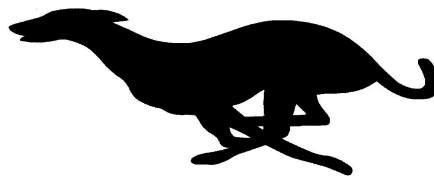
Yamada & Tokuriki (2000) evaluated 10 caged beagle dogs. They found that gross differentiation of quantitative spontaneous activities might be possible by using only the accelerometer if the threshold of the accelerometer and the amount of acceleration volume were set adequately: the more sensitive the setting, the more 'limb movements' versus 'overall body movements' were recorded.

Where to place the accelerometer was studied by Hansen et al (2007). They evaluated 8 different locations (rotated among collar, vest, and forelimb stocking locations). All mounting locations provided acceptable correlation with videographic measurements of movement and mobility, and the ventral portion of the collar was determined to be the most convenient

location. These authors further suggested that accelerometry was an adequate at-home activity monitoring device that could have use for evaluation of end-point activity levels in clinical trials of chronic diseases as an example.

Dog food companies have even looked at use of accelerometry as a way to predict daily maintenance energy requirements (Wrigglesworth et al 2011). "Improved accuracy in estimations of MER could be made for each dog if an accelerometer was used to record its daily activity."

However Preston et al (2012) studied use of the tool with dogs on a treadmill – incorporating incline as well as speed. They concluded that accelerometers are a valid and objective tool able to discriminate between and monitor different levels of activity in dogs in terms of speed of movement but not in energy expenditure that occurs with movement up hill.



Accelerometry References:

Dow C, Michel KE, Love M, Brown DC. Evaluation of optimal sampling interval for activity monitoring in companion dogs. *Am J Vet Res.* 2009. Apr; 70(4): 444 – 448.

Hansen BD, Lascelles BD, Keene BW et al. Evaluation of an accelerometer for at-home monitoring of spontaneous activity in dogs. *Am J Vet Res.* 2007 May; 68(5): 468 – 475.

Michel KE, Brown DC. Determination and application of cut points for accelerometer-based activity counts of activities with differing intensity in pet dogs. *Am J Vet Res.* 2011 Jul; 72(7): 866 – 870.

Preston T, Baltzer W, Trost S. Accelerometer validity and placement for detection of changes in physical activity in dogs under controlled conditions on a treadmill. *Res Vet Sci.* 2012 Aug; 93(1) 412 – 416.

Wrigglesworth DJ, Mort ES, Upton SL, Miller AT. Accuracy of the use of triaxial accelerometry for measuring daily activity as a predictor of daily maintenance energy requirements in health adult Labrador Retrievers. *Am J Vet Res.* 2011 Sep; 72(9): 1151 – 5.

Yam PS, Penpraze V, Young D, et al. Validity, practical utility and reliability of Actigraph accelerometry for the measurement of habitual physical activity in dogs. *J Small Animal Pract.* 2011 Feb; 52(2): 86 – 91.

Yamada M, Tokuriki M. Spontaneous activities measured continuously by an accelerometer in beagle dogs housed in a cage. *J Vet Med Sci.* 2000, Apr; 62(4): 443 – 447.

Laurie's thoughts on accelerometry:

I think this tool has a great potential from a canine rehab perspective.

Is the dog more active on an average day subsequent to a course of OR on-going therapy (for osteoarthritis, obesity management, post-operative care...)?



So what can we take from all of this?

1. Because of genotype-sensitivity to exercise... I'm not likely to ever have skinny thighs!
2. Exercise prescription for older dogs likely needs to incorporate 4 different facets: Aerobics, strength, balance & flexibility
3. Outcome measures should be incorporated into more exercise programs and MAY include accelerometry or a 6-minute walk test.
4. Four Leg Rehab subscribers are miles ahead of their competition... simply because they read this!

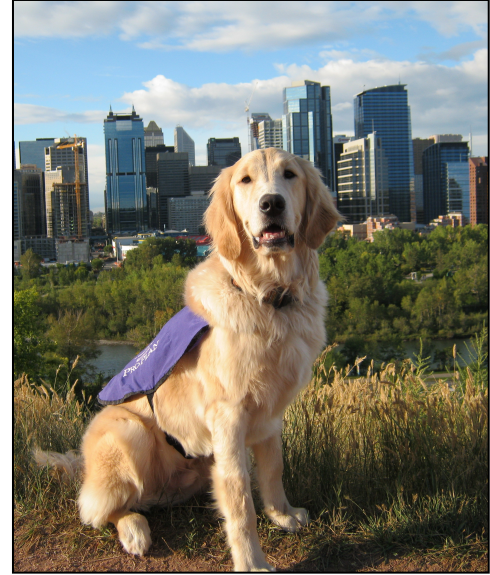
What Should We Cover Next?

Here's a list of great ideas I've gotten from you...

- Exercise and the amputee
- Anatomy
- What to do & not do when starting a rehab practice
- Obesity programs
- Conformation
- Neuro rehab
- Anything Laurie... I'm loving the info!

I confess... I took one day off in August... a Tuesday (today actually)... and I got a lot done! I should take off one day a month every month! It might be good for my sanity. I know... it's not really a day off because I sat in front of my computer... but sometimes it just feels good to get caught up and have time to think and create!

Thank you all for joining me! Until next time... CHEERS!
Laurie



National Service Dog Tonka & the
Calgary downtown



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