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Four Leg Rehab

Newsletter

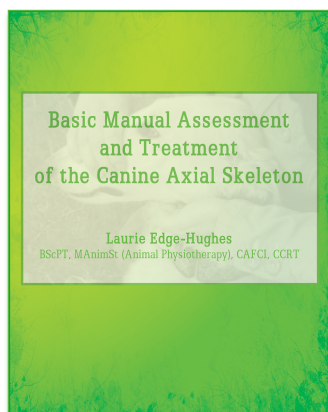
The Exercise Issue – Part 1!

Volume 1, Issue 3

In this issue!

- 1) An interesting an evidence-based look at how we exercise ourselves and our patients.
High Intensity Interval Training & Power Training
- 2) Some of My thoughts on how to utilize the new exercise information
- 3) Some innovative exercise equipment designs by Dr. Kelly Avila, DVM, CCRT

Are you a Subscriber to FourLeg.com? Members who subscribed before Aug 31, 2012 have or will soon receive:



Laurie's newest book!

INSPIRATION AT EVERY TURN...

I have to admit that I don't really have a plan regarding the topics of upcoming newsletters. Not until I start looking into literature, reading your e-mails, talking to colleagues, reflecting on my recent patients, do I get a spark for the next topic. There doesn't seem to be any shortage of inspiration however!

This edition of Four Leg Rehab News started with me searching for marketing information... I found some great articles on Relationship Marketing that I wanted to share... but then I received the latest Orthopaedic Division Review (from the Ortho Division of the Canadian Physiotherapy Association) and inside was tons of information on cruciate rehab... which tied in nicely with a question I received about Tight Rope surgeries... that further sparked me to do a little search for the latest research on canine cruciate ligament... but then I started to read a scholarly paper I have to read and grade for a physiotherapy master student on the Comparison and Contrast of the Human and Canine Meniscus. Oh the choices! Why would I ever find myself in consternation over not having a topic???

So in the end, I wanted to review a fabulous lecture I attended at the Canadian Physiotherapy Association Congress in Saskatoon, Saskatchewan (yes, you read that right – we have a place called that!), in May 2012. I found the concepts fascinating and I think you will too! As well, this is the first time I have had a guest author... and I'd love that to be a regular occurrence. So, let me know if you'd like to contribute, because I'd love to read about the great things that others are doing and finding out there!

Happy reading!
- Laurie



High Intensity Interval Training and Power Training New Concepts for Rehab

With the enticing title of *Revolutionizing Rehabilitation and Healthy Aging: Bringing Exercise 'Taboos' into the Mainstream of Care*, Dr. Scotty Butcher, PhD, BSc(PT), CSCS, ACSM-RCEP and Dr. Sandra Webber, PhD, MSc, BMR(PT) presented interesting research perspectives regarding exercise. The presentation took place at the Canadian Physiotherapy Association Congress in Saskatoon, Canada, May 2012.

The aims of the talk were to 1) compare and contrast traditional resistance training with power training, and traditional aerobic training with high intensity interval training and; 2) provide examples of how power and high-intensity interval training methods could be incorporated into exercise programs for older adults and rehabilitation of patients with chronic disease.

Traditional / Current Recommendations

The American College of Sports Medicine (ACSM) recommends that all healthy adults aged 18 to 65 years need moderate-intensity aerobic physical activity for a minimum of 30 minutes 5 days per week, or vigorous activity for a minimum of 20 minutes 3 days per week. ACSM emphasize that lower intensities have some health benefits, but that greater benefits can be gained with higher intensities. Older adults and clinical populations will typically utilize low-moderate intensity. In regards to strengthening, the ACSM recommends that every adult should perform activities that maintain or increase muscular strength and endurance a minimum of 2 days each week.

Power Training

Dr. Webber defined power and power training. She stated that mechanical power is the product of force and velocity (e.g. strength and speed). Power training usually refers to resistance training (the concentric component) at





a high speed with a load of 30 – 80% of the 1-repetition-maximum. She explained that power is important to be able to move quickly with some force (e.g., when avoiding a fall, climbing stairs, walking quickly, getting up from a chair, braking a vehicle). The ability to produce power decreases earlier and at a greater rate when compared to changes in strength with aging. (Strength being the ability to exert maximal force slowly.) In older adults it is power that is associated with function!

The presenter went on to cite literature that provided evidence that power training results in greater power gains than traditional resistance training, and is associated with improvements in dynamic balance, standardized walking tests, foot movement time, composite scoring on functional performance tests, arm curls, and get-up-and-go-tests. A 2011 meta-analysis was cited

as concluding that power training is feasible and may have small advantages for functional outcomes.

In regards to compromised patient populations Dr. Webber reported on literature stating that in patients with Parkinson’s disease that muscle power explained the majority of variance in walking velocity, and that participants with low muscle power were six times more likely to report multiple falls in the past year than those with high muscle power. In another study, COPD patients that completed a lower-extremity power training intervention (2x/week for 12 weeks) were found to have a relationship between knee extension power and gait speed as well as self-perceived activities of daily living. Two additional studies found that power training could yield increases in leg strength and power in post-hip-fracture patients



Calories in Dog Treats

Large Milk Bone:	100 calories	<i>¼ cup cucumbers:</i>	<i>5 Calories</i>
Pigs Ear:	182 calories	<i>¼ cup pumpkin:</i>	<i>20 Calories</i>
Snausages:	33 calories	<i>1 med carrot:</i>	<i>21 Calories</i>
Small Dentabone	105 calories	<i>½ cup popcorn:</i>	<i>22 Calories</i>
Pup-Peroni	25 calories	<i>¼ cup green beans</i>	<i>9 Calories</i>

and knee osteoarthritis patients.

How do we assess patients' power? Dr. Webber suggested clinical applications such as timed tests ('timed get-up-and-go' test, stair climb, and gait speed). How do we prescribe power training? Dr. Webber suggested pneumatic resistance equipment, elastic tubing / bands, weight machines and free weights, as well as functional activities wearing a weighted vest (increasing speed as tolerated). Preparation for power exercising should incorporate about 3 or 4 multi-joint movements (squats, leg press, step ups, lunges, etc), 1 – 3 sets x 10-15 reps, at a perceived exertion of 5-8 out of 10, 2 – 3 times per week for 4 weeks. Progression to power training when familiar with the program, (high velocity concentric exercise) may incorporate 8 – 10 exercises, 1 – 3 sets for 3 – 6+ repetitions at 30 – 60% of 1-repetition-maximum weight for 2 – 3 times per week.

Additional benefits to power training could be that the higher velocities may be perceived as less laborious and that the reduced overall workload per exercise session could be beneficial in terms of energy conservation in compromised patients. Addressing concerns and risks associated with power training, studies were provided that report power training to be well tolerated in both healthy older adults and older adults with mobility limitations and that the number of incidents and types of incidents (musculoskeletal injuries / exacerbations, cardiac symptoms) were similar in power training and strength training programs. One study followed 112 older adults and reported 16 adverse events (0.34%) over 4711 strength tests, and 4 events (0.25%) in 1633 training sessions. The adverse events were primarily musculoskeletal and/or exacerbations.

The considerations for power training were 1) begin with a conditioning phase (focusing on strengthening and familiarization with the particular exercise for 2 – 8 weeks, 2) pay attention to stability and safety with quick movements (watch the body position for balance and to localize intended movement), 3) proper warm-up for specific muscle groups, 4) consider multi-joint exercises, and 5) specific instructions for concentric and eccentric portions of movement.



High Intensity Interval Training

Next on stage was Dr. Scotty Butcher to speak on high intensity interval training (HIIT). Dr. Butcher revealed how the ACSM's recommendations for aerobic activity has reduced over the years, and it's not because we actually need less exercise to obtain cardiorespiratory fitness, but rather that people still aren't exercising enough, and the recommendations are reducing simply to seem more achievable! The number one reason why people state they don't exercise is that they don't have enough time. Dr. Butcher presented that HIIT is at least equal (or superior) in multiple physiological and health markers. In order to get the same adaptation using continuous training, the volume of training is much higher, and is associated with an increased risk of repetitive strain injuries. Additionally, it was presented that in many clinical populations, the volume of continuous training required for optimal adaptation is both impractical and inefficient and in many chronic disease populations the ability to sustain a high cardiovascular load is impaired. To address the limitations of continuous training in a patient population (or otherwise), Dr. Butcher recommends HIIT.

High intensity interval training is defined as "brief, intermittent bursts of vigorous activity, interspersed by periods of rest of low-intensity exercise." There can be many modes of HIIT. Essentially, the overall training is lower in volume but higher intensities than continuous training. The published adaptations to HIIT include: Increase in VO_{2max} and aerobic endurance; Increase in cardiac output and oxygen extraction; Marked mitochondrial enzyme changes; Marked improvement in endurance performance; Multiple health markers (insulin / glucose, blood pressure, endothelial function, pulmonary function, muscle strength, and cardiovascular health).

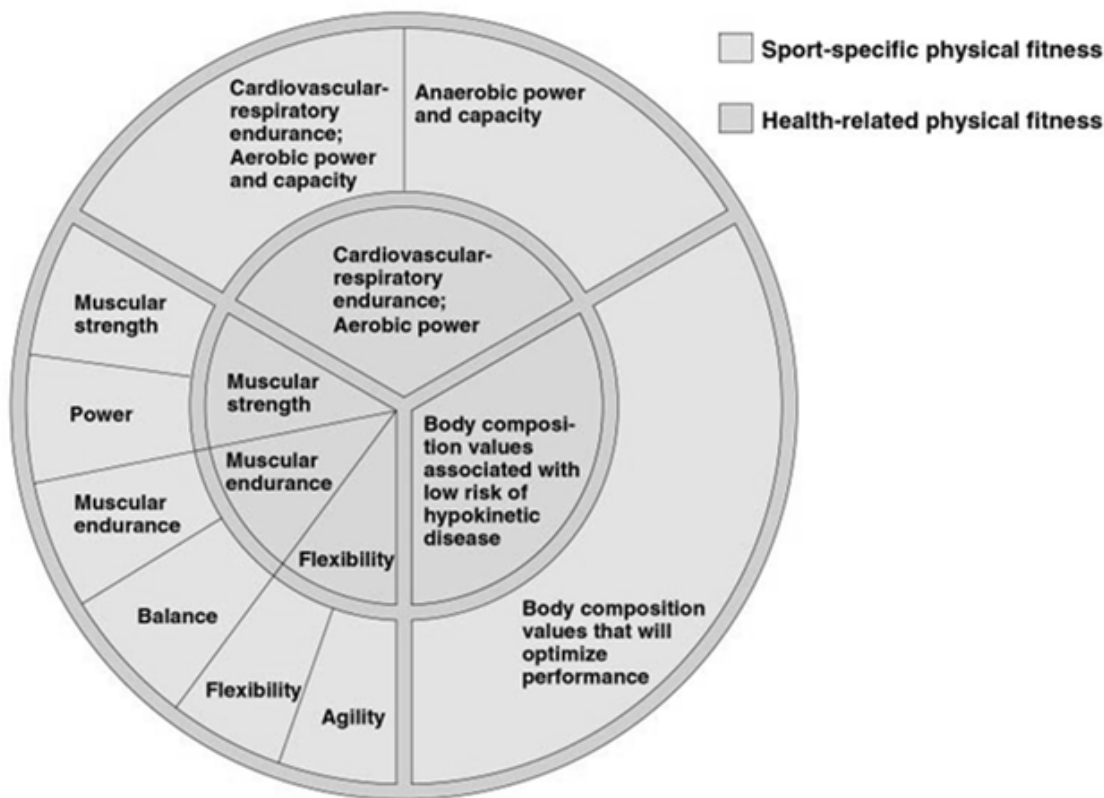
Not only does HIIT produce marked health benefits, research also backs up that the perceived enjoyment from exercise is higher! Several literature papers were cited that show HIIT to be better or similar to continuous training in health subjects, patients with coronary artery disease, congestive heart failure, COPD, metabolic syndrome and obesity. An interesting finding regarding the latter is that comparing the two exercise methods, no difference was seen in weight loss, but the HIIT had a greater loss in fat and increase in lean muscle mass (which would relate to more inches lost!).

Safety of HIIT was discussed. Dr. Butcher reported that out of all studies examined minimal adverse effects (musculoskeletal) were noted. The overall safety for mass prescription is unknown... however, due to the reduction in overall cardiovascular stress by allowing recovery period between intervals, adverse reactions are likely less than continuous exercise. The point was made to screen and monitor your patients.

The prescription framework for HIIT can vary. Usually functional activities are best, and the 'workout' does not need to be typical aerobic activities. When making recommendations, it is the recovery times that can vary, but the intensity (perceived exertion as it might relate to VO_{2max}) should not.

Differentiation was made between recommendations of using HIIT for high performance (i.e. athlete in training) as compared to HIIT for health. Essentially, in regards to 'aerobic' training, if using HIIT for health, then 100% of workouts could utilize HIIT. However when using HIIT for performance / in a performance athlete, then only 15 – 50% should be utilized... bearing in mind the athletic goals. The following chart describes well the breakdown between health-

related physical fitness and sport-specific physical fitness and the relevant amount of time dedicated to all aspects of performance.



The presentation concluded with a case example of a rehab patient that could be 1) prepared for power training (lower body strengthening); 2) engaged in functional HIIT (utilizing walking and climbing stairs); 3) progressed to power training (using pneumatic machines, weighted vest, water exercise, tubing and bands); and then 4) progressed in the HIIT (more stairs and walking- additional flight of stairs added). The presenters urged the audience to try to incorporate some of the concepts into their patient population recommendations.

Laurie's ideas for utilization of the information presented...

Home-based High Intensity Interval Training

1)
 Warm up walk or light jog for 5 minutes.
 Sprints (i.e. chasing a ball for 60 seconds)
 Walk for 60 seconds, or short ball tosses
 Repeat 10 times.
 Cool down walk for 5 minutes or longer

2)
 Warm up walk or light jog / light play for 5 minutes
 Hill running (with owner or retrieving ball) for 30 – 60 seconds
 Walk on flat or short ball tosses for 60 seconds
 Repeat 10 times.
 Cool down walk for 5 minutes or longer

3)

Warm up walk or light jog for 5 minutes
 Hold dog back while a second party runs ahead about ¼ of a mile.
 Release the dog to sprint to the person ahead.
 Walk until the person behind catches up
 Repeat 4 or 5 times (or more – depending upon fitness level of everyone involved... good for the whole family)
 Cool down walk for 5 minutes or longer

Power Training Exercises

- Destination jumping (onto a platform or over a jump)
- Tug of war exercise
- Games of 'chase'
- Step-Ups
- Hill walking (steeper inclines, or in a weighted vest/backpack - starting at about 2 – 5% of the animals body weight)

Underwater Treadmill Options

- 1) Slow & Steady – (best for dogs 'new' to fitness programming)
 - Warm up at comfortable walking speed x 2 minutes
 - Increase by a few points of a mph every minute
 - Take to the best steady state (mid to higher level of perceived rate of exertion). Stay at this state for ¼ - ½ of total time.
 - Cool down x 2 minutes walking
 - Overall time may start at 10 – 15 minutes and progress by a minute or two each session.

- 2) Perceived rate of exertion (p.r.e.) training (progression from slow and steady... or good for dogs already in 'decent' condition)
 - Warm up at 'p.r.e.' of 3 or 4 for 3 – 5 minutes
 - Increase p.r.e. to 6 x 2 minutes
 - Increase p.r.e. to 7 x 1 min
 - Increase p.r.e. to 8 x 1 min
 - Increase p.r.e. to 9 x 1 min
 - Increase p.r.e. to 10 x 1 min
 - Decrease p.r.e. to 6 x 1 min
 - Repeat 7, 8, 9, 10 p.r.e.
 - Cool down x 2 min

- 3) Interval Training (for a dog already in good condition)
 - Warm up 3 – 5 minutes fast walk
 - 1 min increase by 2mph, then lower for 1 minute walking
 - 2 min increase by 2.5mph, then lower for 1 minutes walking
 - 1 min increase by 3mph, then lower for 1 min walk - jog
 - 2 min increase by 3mph, then lower for 1 min walk - jog
 - 2 min increase by 3.5 mph, then lower for 1 min walk - jog
 - 2 min increase higher (than above), then lower for 1 min walk - jog
 - 2 min increase at high rate AS ABOVE, the lower for 1 min walk – job
 - 2 min increase at higher (than above), then walk x 2 min
 - (Increases are estimates only – you will need to watch the dog and see if the speed increase is too much or too little.)

Things to watch for with Exercise

- 1) Large purple tongue (could indicate lack of oxygen... decrease speed or remove from program if walking speed does not remedy the issue).
- 2) Lameness or gait imperfections (may need a re-evaluation)
- 3) Cheating, lagging, or tripping (decrease speed, if continues may need a re-evaluation)

Things to ask the client

- How long did it take him/her to recover after last session?
- Any lameness or stiffness noted?
- Is he/she otherwise pretty health this week?

Innovation in Action!

Creative Exercise Equipment for the Mobile Rehab Practitioner

Dr. Kelly Avila, DVM, CCRT

I am a house call veterinarian with a practice limited to acupuncture and physical rehabilitation. The equipment I use has to fit into my hatchback vehicle and I have to accommodate the space that the pet owner gives me to work in. Therefore I have taken Laurie's advice of using what you have and inventing what you want to use for your patients to heart. I have a diverse group of clients living both in the city and in rural areas. The patients I see are also diverse in size and in ability. Thus my equipment reflects this.

My primary motivation in making equipment is increase the level of client compliance for the treatment plans I prescribe to my patients. I have four concerns in mind when I make equipment. One is that it be composed of multifunctional parts, which allow the pet to do more exercises with a smaller amount of equipment. The second

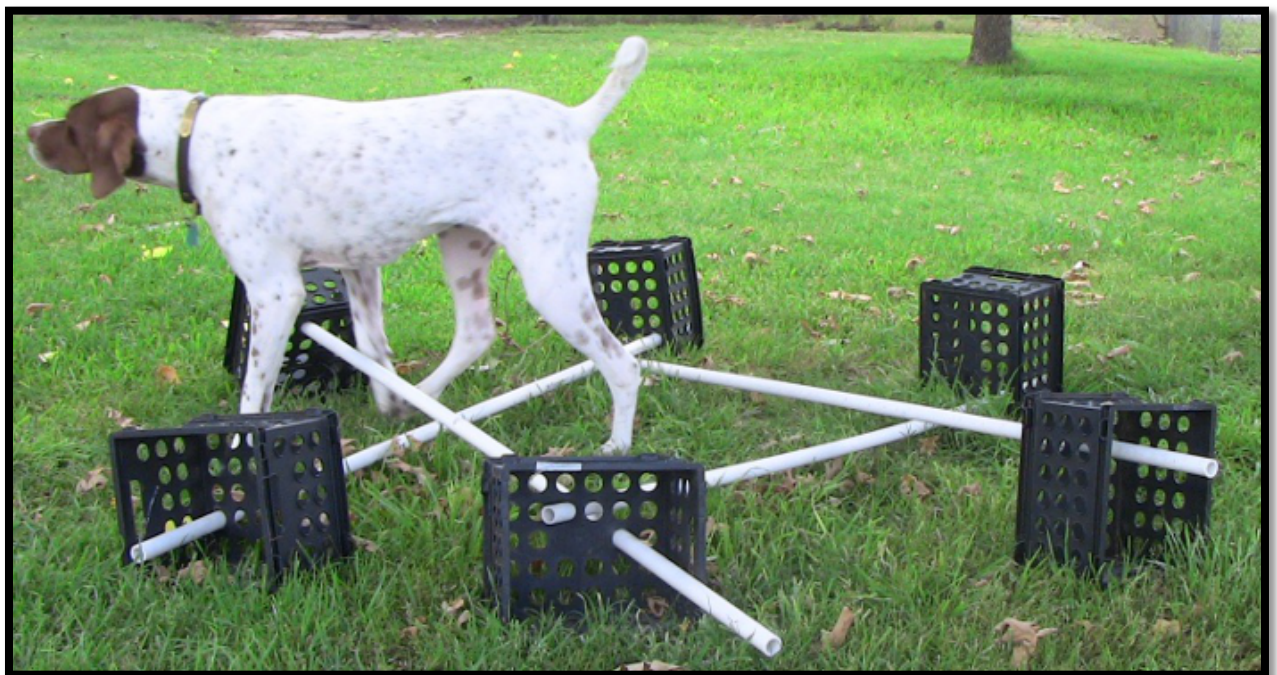
concern is that it be easy to set up and take down for the pet owner, if they are frustrated by the set up they will be less likely to use the equipment. Three is that the equipment be durable as I have some clients that leave the equipment set up in their backyards all the time. Lastly, cost is a factor; I want to make the least expensive and best equipment I can so I shop around a lot for parts. I also make equipment out of cast off objects whenever possible in order to recycle and reuse materials.

Some examples of equipment I have made include rope ladders made both of polyvinylchloride pipes of various diameters as well as using foam noodles of various diameters. I use that instead of having a set of cones and PVC pipes as it is compact and a bit more challenging for the pet. I have constructed a PVC pipe and basket set up to leave in place for proprioception work. Most recently I have constructed a "destination jumper" out of pvc pipe and marine vinyl that is a big hit with the patient I constructed it for.





PVC rope ladder and Beaux



Pick up sticks that can stay outdoors

You're Up!

If you have an idea, a creation, a great case, or a question to be answered... please send it along and it could be included in an upcoming newsletter!

Next issue, I'd like to focus a bit more on exercise... (Honestly, it's because I found some great information that I didn't have room to include in this issue!)



Cheers!

-Laurie



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